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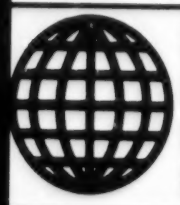

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CHINA: Energy

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China: Energy

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No Easy Solution Seen for Energy Dilemma

40130088 Beijing GUANGMING RIBAO in Chinese 10, 11 Apr 89

[Article by GUANGMING RIBAO reporters Qiao Di [0829 0966] and Yi Yunwen [2496 6663 2429]]

[10 Apr 89 pp 1-2]

[Text] Part One

If energy resources are the blood of modern society, our comprehensive energy shortage at the present time is making China anemic.

I. Electric Power Is Making Millions Upon Millions of People Restless

A. Beijing

On the eve of the Spring Festival in the Chinese lunar calendar, Deputy Mayor Wu Yi [0702 0308] received a phone call from a Beijing resident: "Deputy Mayor Wu, the festivals are coming soon. Will our power still be cut off? I can't watch TV or use my refrigerator. What are you doing as deputy mayor? I think I'll kill you!" Deputy Mayor Wu responded with a bitter joke: "OK! Kill me, I'll be happy to be able to light up Beijing!" What could he do? In that period, 8 or 9 of every 10 phone calls received in the mayor's office concerned electric power.

Perhaps the Beijing resident who called did not know that while he could not watch television, power outages also were affecting the Ministry of Energy Resources, China's biggest power management "yamen" [government office in feudal China]. It seemed that every Thursday was a "statutory power outage day." Power cutoffs have even affected meritorious and distinguished Marshal Nie Rongzhen [5119 2837 5271], who enjoys high prestige and commands universal respect, and other national leaders for the first time in the 40 years since our nation was founded.

Millions upon millions of people are worried about electric power. Assuring residential power supplies for Beijing during the Spring Festival has become a matter of great urgency.

Premier Li Peng gave special responsibility for dealing with the question of power supplies for Beijing during the Spring Festival to State Council member Zou Jiahua [6760 1367 5478]. The relevant departments used various means to purchase 20,000 tons of high-priced oil and 40,000 tons of expensive coal to raise the 175,000 kW power index. Beijing is now accustomed to frequent power outages. Excluding accidental shutdowns, not a single household in the city and suburbs was plunged into darkness because of excessive power loads from 4 to 10 February 1989. After 11 February 1989, however, there were many more forced power shutoffs than in 1988. Officials in the Beijing Power Supply Bureau said that "Beijing has a total of 1,000 power lines, but our daily shutoffs now exceed 1,500 line-times."

B. Guangzhou

The entire city of Guangzhou formally implemented a plan to reduce power use announced by the city government on 23 November 1988: "Current will be shut off on residential power lines 1 or 2 nights each week in rotation for different areas."

C. Nanyang, Henan

During the spring wheat irrigation season, a peasant labored to install a water pump, connected the power lines, and opened the valves to pump the water. After pumping less than 5 minutes, however, the power went off abruptly. Moreover, this shutoff lasted 2 days and 2 nights. For these 2 days and nights, family members took shifts in the fields, saying they did not know when the power would return.

D. Yichun, Jiangxi

We visited this county seat in December 1988. Power was shut off 5 nights during the week. The entire city was dark and shops lit candles to stay open.

...Power! Power! Power! Power is making millions upon millions of people restless. From top to bottom, people in all fields have focused their attention on energy resources for some time.

II. Modernization in China and the "Wooden Bucket" Theory

Director Lu Chunheng [4151 2504 1854] of the Industry and Communications Department in the State Statistical Bureau pointed out that the "comprehensive energy resource shortage has become the main factor which restricts China's progress toward modernization."

If you do not believe this, please look through these lenses:

The energy shortage has forced many plants in Shanghai, China's biggest industrial base area, to shut down 3 days and operate 4 days, or even to shut down 4 days and operate 3 days. Many township and town enterprises in Jiangsu and Zhejiang have been forced to shut down 5 days and operate 2 days. Inadequate power supplies at the Guizhou Aluminum Plant have reduced output there to less than one-third of production capacity.

Some industries which demand sustained and balanced electricity supplies like the glass industry, textile machinery, metallurgical, processing, and others are often forced to discard products because of power outages. The cloth they produce is uneven in thickness, as is the depth of color in the products they dye. Power outages deform glass utensils. Industrial and agricultural production

losses due to power outages over the past 7 or 8 years amounted to the enormous sum of 200 billion yuan.

Information gathered from all areas by the state Ministry of Energy Resources shows that China now has a comprehensive energy resource shortage. Long-term shortages of electric power and petroleum have intensified, and shortages in coal supplies have reappeared since the last half of 1988. North China has a power shortage! Northeast China has a power shortage! East China has a power shortage! Unprecedented power shortages have even appeared in the energy resource base areas of northwest and southwest China! Everywhere there are shortages in energy used for production, power generation waits for coal, oil shortages are forcing shutdowns, and production is stopping to wait for power. There also is a growing shortage of power for household use. Some areas and cities have sold out of coal for residential use and the pressure of urban coal gas is seriously inadequate.

China cannot stand weakness in energy resources when it is at the vanguard of our initial modernization.

This refers mainly to energy resources used in industry and cities. If we include China's vast countryside, the energy situation is even more serious. Because it leads the way to becoming "relatively well-off," modernization is not a purely urban matter.

Researcher He Bochuan [0149 0590 0278] feels that China's modernization is like water in a wooden bucket. The water level determines the shortest bucket. This is even truer for the severe energy resource shortage, where the hole is very low and very large.

Thus, we must double energy resource output by the year 2000 to guarantee a quadrupling of the gross value of industrial and agricultural output. Failure to change the energy resource shortage situation would be the same as an anemic person competing in the Olympics against the best.

III. The First Cause of Anemia: Economic Overheating

State Council member Zou Jiahua recently received a foreign delegation. The visitors asked: What is the elasticity coefficient between growth in China's energy resource industry and economic development? When Zou Jiahua told them it was 0.8, the visitors were astonished.

Zhu Shuhong [2612 2885 1347], deputy director of the Ministry of Energy Resources office, explained: "In view of the paths taken by the developed nations of the West, when there is substantial economic growth, the elasticity coefficient for growth in energy resources and economic growth should be slightly more than 1 to promote coordinated development of the economy. In China, however, the elasticity coefficient of the rate of growth in primary energy resources and industrial construction was just 0.21. It was higher for electric power, but still less than 0.6."

The recently issued "Statistical Report on National Economic and Social Development in 1988" indicates that primary energy resource output in China during 1988 was up by 4.2 percent over 1987, while the rate of industrial growth over the same period was 20.7 percent. Moreover, the ratio between power-using equipment capacity and power-generating equipment capacity was nearly 3:1, meaning that 3 kW in power-using equipment awaited use for every 1 kW of power generated.

Some people have drawn a vivid metaphor: if China's energy resources at present were sufficient only to build five buildings, there would be competition among 15 buildings. Everyone knows that some would not be built and that they would be useless if they were built, yet everyone wants to build his own and no one dares to abandon their plans. With inadequate energy resources, they would make competing demands or even steal electricity, hijack coal, or do other unthinkable strange or scandalous things.

Thus, when Minister Huang Yicheng [7806 3015 6134] of the Ministry of Energy Resources announces that: "in 1988, China over-extracted oil, over-produced coal, operated lines at excess capacity, and over-generated electricity," all areas will announce frequent energy warnings and raise repeated hues and cries, and a whole series of shortages will appear. This can be expected.

IV. The Second Cause of Anemia: Loss of Macroeconomic Control

Deputy Director Wang Qingyi [3769 1987 0001] of the China Energy Research Society feels that China's energy resource shortage involves historical debts as well as serious new mistakes in planning and guiding ideologies.

Without a clear understanding of stratigraphic oil reserves, hard decisions require high indices. Blind extraction can make it impossible to extract even half the oil in other oil pools. Small coal pits can be developed, but without management and investments they can cause serious destruction in coal regions which formerly could be used for modernized production. Professor Zhu Yajie [2612 0068 2638], director of the China Energy Research Society, feels that "this is a destructive, suicidal policy for energy resources."

The view of Wang Baohua [3769 1405 5478] of the State Planning Commission's First Planning and Industry Department is that arranging development of the energy resource industry now on the basis of annual and 5-year plans is basically wrong! An even longer-term strategy is required for this basic industry which involves huge investments, long construction schedules, and produces results slowly. We now must consider the energy question for the beginning and even the middle of the next century.

Director Zhuge Shuxun [6175 5514 2885 8113] of the Fuel Department in the State Materials Bureau told reporters that "a loss of macroeconomic control is also

manifested in severe chaos in the realm of circulation. The law of prices and administrative orders operated simultaneously in the initial period of the commodity economy and came into conflict. Those with money but no authority do business with those with no money but with authority and abrogate the state's interests." He provided a major example for reporters: In 1988, 3.6 million tons of coal included within plans was shifted outside of plans. One ton, worth over 60 yuan in the producing region, could be converted into more than 200 yuan in east China and over 300 yuan in Guangdong. Some "coal profiteers" even mix rocks with coal so that 2 tons of coal contain 1 ton of rock. Users know it is a sham, but they have to buy it since there is no other coal. This has cheated coal users, harmed those who mine coal, and enriched the coal profiteers, and it severely wastes a formerly insufficient state energy resource. Because the rocks absorb heat, about half of the heat value of each ton of coal is wasted.

"In the final analysis, the loss of macroeconomic control is manifested primarily in a serious loss of proportion between the energy sector and economic development." Zhu Shuhong emphasized that "actually, it is the amount of energy resources available which determines economic development plans, and it is economic development plans which determine the amount of energy that can be supplied. This question certainly deserves serious consideration by our experts and policymakers."

[11 Apr 89 pp 1-2]

[Text] Part Two

V. The Third Cause of Anemia: Blind Optimism

In April 1988, Huang Yicheng, who was about to become minister of the Ministry of Energy Resources, invited several energy experts to a meeting. Huang Yicheng offered a prediction which permits no optimism: if we fail to solve our energy problems, an energy crisis will occur in 1992. Who would have thought that not long after this statement was made, we would enter this crisis just as the Ministry of Energy Resources was established in June 1988.

"It would seem today that this pessimistic thesis was still too optimistic." Many experts said this.

Experts feel that blind optimism in China's energy sector is manifested in at least two areas:

During the 3-year period between 1983 and 1985, rapid growth in small coal pits gradually improved coal supplies. Many people were emboldened by this superficial phenomenon and thought of issuing calls similar to "what can we do with too much grain?" and "what can we do with too much cotton?" They asked "what can we do with too much coal?" Everyone thought the coal problem was solved, the state relaxed its inputs in the energy sector, and the proportion invested in the coal industry dropped abruptly from 7.3 percent in 1984 to 4.2 percent in 1987. The inadequate investments reduced the number of projects started and the scale of investments. Output shrank substantially and even dropped in some areas instead of increasing. Much of the "black demon" [coal] lies on the ground and people no longer ask why.

There were large overstocks of coal at coal base areas in the past to the extent of having to dump some in the Huang He. People blamed backward railroads. Now there is of course a shortage in railway freight capacity as we had in the past, but even more serious are our inability to mine more coal and the phenomenon of cars sitting waiting for coal which has appeared in some areas.

Regarding power, electric power departments have been declaring power shortages since 1970. Certain leading departments denied them but admitted them later, and their estimates were overly optimistic. They felt the problem could be solved merely by reducing non-productive and residential electricity use. By 1986, with the emergence of tertiary industries, a "household appliance heat wave" arose. Only then was it acknowledged that reducing non-productive uses of electricity to assure productive uses was not feasible and that solving the power shortage could not be delayed. This, however, is the situation now: the annual power shortage is not a few 10 billion kWh. It is instead nearly 200 billion kWh. Moreover, there is a shortage of active power as well as non-active power. There are shortages of power sources as well as power grid matchup, communications matchup, and so on.

Zhu Chengzhang [2612 2052 4545] in the Ministry of Energy Resources Planning Department issued a warning from the perspective of an expert: "Since we began to accelerate electric power construction in 1986, although we have added several 10 million kW in power generation equipment, we have not solved the power shortage. Instead, there is still a major discrepancy."

VI. The Fourth Cause of Anemia: Wasteful Demand

Wang Qingyi's first statement when meeting with reporters emphasized that "the main problem in the current energy crisis is in the area of demand. Wasteful demand for energy resources in China are like a bucket which can never be filled. This is manifested in overheated growth of processing industries and excessive development of hotels and restaurants. High energy consuming household appliances have been popularized too quickly and too many small vehicles and other high energy consuming equipment have been imported."

Hotels. Data show that a single medium-sized hotel consumes about 10 million kWh annually. The Changcheng [Great Wall] Hotel alone consumes as much power each year as the entire city of Beijing consumed annually shortly after liberation. China now has over 1,000 high-grade hotels just for foreign visitors. If we add

all the other hotels and restaurants of various types, we can comprehend their energy consumption.

Household appliances. A "consumption revolution" with a vanguard of household electrification is now surging across China. It would appear that the "three old items" [bicycles, radios, and sewing machines] have been supplanted by televisions, washing machines, electric fans, electric cookers, refrigerators, electric ovens, and home air conditioners. A replacement generation of large-screen color televisions, video recorders, fully automatic washing machines, dust removers, decorative lights, air conditioners, electric heating, and electric cooking is now fermenting. The modernized Western nations took 30 to 40 years to complete household electrification. We are thinking of doing it in a few years. Household members only know that they have no power for their electrical devices so they are right to complain, but they do not know that one-sixth of additional power output is "devoured" by these appliances every year. Estimates are that the amount of power consumed by electric refrigerators will exceed 6 billion kWh by the year 2000.

Small vehicles and other high energy consuming equipment. In mechanically pursuing a balance in foreign trade, we exported 30 million tons of petroleum in 1988, but we used the foreign exchange to import 2 million video recorders and many small vehicles. Our formerly insufficient energy sold out and we imported a large amount of high energy consuming equipment. This was the same as importing energy demand by reducing supplies and then expanding demand. How can there not be an energy shortage?

VII. The Fifth Cause of Anemia: Distorted Price Laws

Two things have scared people in the coal industry and made people in the know outside the industry feel frightened and powerless.

The mining bureau forced Kailuan Coal Mine, a large state unified distribution mine, to provide others with a large office building to do business. It then paid the money as wages to the workers for the Spring Festival.

At Jingxi [West Beijing] Coal Mine, 8,000 peasant workers who originally fought to mine coal packed their bags and returned to their villages before the Spring Festival. They said, "We earn over 10 yuan a day, but it costs nearly 10 yuan to eat and have a drink. Who wants to work himself to death for a few yuan?"

Coal miners work at the dirtiest, most tiring, and most dangerous labor. In the past, their wages were among the one or two highest in the ranks of employees, which attracted people. Now, the wage level has dropped to 11th or 12th place.

Statistics show that China's unified distribution coal mines lost over 3.6 billion yuan in 1988. Losses in the Petroleum and Natural Gas Corporation exceeded 1.4 billion yuan. Losses have even begun to appear at Daqing Oil Field, which has provided about one-half of China's total crude oil output for the past decade. Although industry-wide losses have not yet appeared in the electric power industry, comprehensive losses have appeared in northeast China and the Yunnan Power Bureau.

The tide of the commodity economy is rolling over the world outside the circle, while the world inside the circle is still in the same old product economy model. Although the state has made some micro-adjustments in some energy prices in the past few years, it still has not basically reversed the situation of severely distorted energy prices.

People in the know are extremely worried. China Energy Research Society members and academic comrades gave this explanation to reporters: "The prices of coal, electricity, and other energy resources are too low, sometimes not enough to repay costs. Anyone aware of this is very worried. Everyone knows that failure to raise energy prices violates the law of prices and encourages wasteful demand. It attacks the work initiative of employees in the energy industry and makes it impossible for the energy sector to have the capacity for self-development. Without reform of the product economy in the energy industry, the structural shortage of energy resources will never change. However, everyone fears that energy price readjustments would create new waves in prices for all materials. The commodity economy has fallen into two predicaments in this area."

How can we get out of our predicament? Zhuge Shuxun described this view to reporters: "Overall, we should integrate readjustment and deregulation, implement them in stages, begin with straightening out regional price differentials, quality price differentials, and product variety price differentials, formulate maximum price limits and minimum guaranteed prices, gradually eliminate the two-track system for prices, and shift to market-determined prices."

VIII. Can "Opening Up Sources" and "Reducing Expenditures" Make China Strong?

On 23 January 1989, while listening to situation reports at the National Energy Work Conference, Premier Li Peng pointed out that China's energy resource development strategy should combine development and conservation, and assure stable growth of the energy sector.

Investment is the main problem facing energy resource development. The CCP Central Committee has proposed giving energy departments "slanted investments" but limited state financial resources have made actual implementation very difficult. How, then, can the energy sector overcome its problems and implement "slanted investments"? Wang Baohua's idea is that simply relying on central authorities to manage energy resources is not feasible. Local responsibility for building power stations and coal mines should be strengthened. Consideration

can be given to something besides oil fields because of the great investments and large amount of engineering involved. Provinces with energy resources should develop them themselves. Provinces without energy resources can join with other provinces or turn over their capital to higher authorities and let them decide how much energy to supply them depending on the amount of capital they provide.

Like the ideas of the students, we should establish a compulsory energy resource construction fund in the processing industry and set aside a portion outside of budgeted income as a special fund for special purposes.

Zhuge Shuxun's idea basically involves readjusting contractual responsibility base figures for local financial administrations and expanding revenue sources for central authorities.

China's energy shortage has compelled many suffering people to suggest various ideas for solving China's energy crisis. These ideas may not yet be mature and may have defects. However, they are valuable in themselves and express the high sense of responsibility of some intellectuals concerning China's fate. People can of course suggest even ideas to search for optimum energy resource development policies and compensate for inadequacies in our ideas from various perspectives. There is, however, just one overall goal: to be able to provide more energy resources for China's tomorrow!

The entire world acknowledges that China's energy resource utilization rate is low. The World Bank has made an authoritative estimate: energy consumption per unit value of product in China is more than double the average figure in other developing nations.

This is a crisis and a source of latent potential! Engineer Yang Songling [2799 2646 0134] described what would seem to be a more optimistic prospect to reporters: "If we increase China's energy utilization rate from less than 30 percent at the present time to the more than 40 percent level in Japan, the level of economic growth in China in 1988 could be sustained with 300 million tons of standard coal. Instead, China produced 930 million tons of standard coal in 1988, and we still had an energy crisis."

Energy conservation, however, is not just an administrative problem. It also involves issues of technical transformation and technical improvement. Some 60 percent of China's electromechanical products are very backward and outdated, and consume enormous amounts of energy.

However, enterprises are neither pressured nor motivated to spend much capital for transformation to achieve energy conservation. An "Energy Conservation Law" is now being formulated, but Wang Qingyi feels that this merely solves the pressure problem. We still must begin with straightening out energy resource prices if we wish to make enterprises themselves understand the motive power of energy conservation, be motivated by the interests of energy conservation, actively invest in transformation for energy conservation, and gradually place energy resources on the track of the commodity economy. This is, however, truly a low process.

Transportation Bottlenecks Blamed for Much of Energy Crisis

40130090b Shanghai JIEFANG RIBAO in Chinese 20 Mar 89 p 3

[Article by Dong Shilun [5516 6847 0243], Sun Lin [1327 2651], and Zheng Xian [6774 2009]: "Coal: What To Do?"]

[Text] Public opinion universally attributes the coal crisis that began in the fourth quarter of last year primarily to transportation. But just what is the current coal transport situation? We visited thousands of miles of coal transport lines to find out.

Coal Transport Is Still Above Quota

At the Bengbu Railway branch office of the Shanghai Railway Office, which is responsible for coal haulage for the Huainan, Huaibei and Wenbei mining offices, office head Yang Fanshu [2799 0416 2885] began by stating that last year the branch office overfulfilled its coal haulage plan by 1.4 percent, hauling 331,000 tons of coal above quota; between 1 January and 25 February of this year it hauled an additional 256,000 tons of coal above quota. At Qinhuangdao port, China's largest energy export location, we saw a continuous stream of coal cars entering the modern coal wharf area. The Changfeng steamers moored at the wharfs had just opened their hatches, and huge coal-loading machines rapidly poured the coal into them at a rate of 6,000 tons per hour, so that 4 hours later they would be full and could depart. Deputy general director Guo Yinchang [6753 0603 2490] of the Qinhuangdao Port railway district headquarters told us that currently, the transport of coal from the Shanxi coal district via the Jingshan, Jingqin and Daqin rail lines to Qinhuangdao port is relatively normal, and that the amount of coal in storage at the port has been increased from 500,000 tons at the beginning of the year to 1.3 million tons; the main conflict is now between shipping capacity and coal production.

People at Pukou, the terminus of the Tianpu line and the second largest coal unloading facility in the country, are distressed by the severe shortage that has resulted because coal shipments to the port have fallen below plan in January and February. Despite vigorous efforts in the diversion of more than 1,600 coal cars from the Bengbu railway branch office and other stations, there is still a transport shortfall of more than 80,000 tons.

In Beijing, officials at the shipping office of the Ministry of Railways told us that the current level of coal haulage is already more than 40 percent of the country's total rail capacity. The daily average actual number of coal cars in

operation nationwide was 332 above plan in January and 1,542 above plan in February.

Officials of relevant departments of the Ministry of Communications revealed that last year, total coal dispatches from ports were up 14 percent from the previous year and that the amount of coal shipped by organizations directly subordinate to the ministry increased by 7 percent. This January the figures were up by respectively 2 and 29.3 percent compared with the same period last year.

A senior energy official believes that given current market conditions and with the coal mines' current coal stocks, it is true that the coal crisis is caused primarily by transport; but by the beginning of this year public stocks of coal had already declined to their lowest level in the last 20 years, so that in some localities transport has temporarily ceased to be the main limiting factor.

Bringing together the information that we obtained from various quarters, we believe that there is some truth to this assertion. The personnel of the communications and transport departments, acting under the principle of "protect the overall situation, protect the key facilities, assure smooth operation," are doing everything possible to maintain coal transport and have already achieved some results.

Transport Is Indeed the Limiting Factor

But can we say that China's coal transport has in fact passed the crisis? No. As one specialist stated, currently our energy crisis is manifested in terms of electricity, but its roots are in coal and the limiting factor is transport. This will continue to be the case, and the situation cannot be fundamentally alleviated for a rather long time. This is because China's overall communications and transport capacities are far smaller than total demand, and the slight current improvement in the transport situation has been brought about by giving up the transport of other goods: thus, it is only by making an all-out effort that a fragile balance has been achieved.

China's huge population and vast area, the nonuniformity of its energy distribution and its uneven economic development have resulted in an excessive mismatch between resource producer and resource consumer areas. In the case of coal, more than 75 percent of the resources are north of the Huang He, while east and south China have major coal requirements, with the result that the railroads have always had the heavy burden of hauling coal from north to south and from west to east. In recent years, industrial growth has been excessively rapid, so that at present the railways can meet only 50 and 70 percent respectively of passenger and goods transport requirements, there is a shortfall in coal transport every year, and, while we have currently assured the supply of coal, we have unavoidably put pressure on other areas: we can do this for a short time, but in the long term it is sure to affect the overall situation. In addition, every year China must increase its generating capacity by 10 million kilowatts, which requires an annual increase of more than 25 million tons of coal; to haul this coal from the locations where it is produced requires the addition of capacity equivalent to that of the Daqin line every year. It is predicted that by 1990, coal shipments to the 12 coastal provinces and cities will exceed 200 million tons, which will require new capacities equivalent to four times that of the Tianpu rail line, an achievement that obviously is beyond the ability of current facilities.

Even now, transport cannot fully meet requirements. At Taiyuan in Shanxi, we met a comrade from Ningxia who had come to participate in a national conference of heads of centrally distributed coal mining, transport and sales offices. He said that last year, large amounts of coal had piled up in Ningxia and that at present more than 2 million tons still has not been shipped, so that the coal mines' only recourse is to limit output. A comrade from the Shanxi Province coal management department stated that Yangquan and five other centrally allocated coal mines still have 5 million tons of accumulated coal. At the Huaibei coal office, an official presented us with the following statistics that provided food for thought: Last year the central plan handed down to the coal office was for 11.71 million tons, but the transport plan established by the railroad departments was only for 10.56 million tons, representing a shortfall of 1.15 million tons. Despite efforts that resulted in the railroads' hauling 130,000 tons above plan, an additional 1.02 million tons was not transported. Similarly, this year the Huaibei coal office has a transport shortfall of 650,000 tons, and it can solve the problem only by selling the coal locally.

The Railroads Are Too Tired

For many years, the increase in the capabilities of China's communications and transport sector fell short of the increase in requirements for passenger transport and goods haulage. During the First 5-Year Plan, for each 1 percent increase in transport capacity, state investments in communications and transport increased by 1.17 percent. But in the Fifth and Sixth 5-Year Plans, the investment increase for each 1-percent increase in transport capacity fell to 0.6 and 0.5 percent respectively. Through rail transport from the coal mining centers that was originally included in the Seventh 5-Year Plan was delayed because of insufficient funds.

As a result of insufficient investment, many trunk rail transport lines have reached the limits of their throughput capacity. The Jinpu line, which has the heaviest traffic in the country, must carry 112 passenger and goods trains a day; with the exception of 2 hours a day reserved for construction work, a train travels the line every few minutes. In addition, the country's railroads have ten-odd bottlenecks such as Fuliji, and investments are needed to expand and rebuild them. The handling capacity of freight cars is also in conflict with the growing transport requirements, rail cars are piling up, and they often cannot be either unloaded, dispatched or loaded. Even if the comrades of the communications and transport departments

spared no effort to find unused potential and made vigorous attempts to alleviate the increasingly acute conflict between transport capacities and haulage needs, the fact that their capabilities are inadequate to their intentions would prevent them from succeeding, and they would have to get by by means of supernumerary personnel, excess loads, and even patching together of equipment and cutting back on safety margins. Everywhere their machinery and equipment is aging, it is operated even when not in good repair, and malfunctions are accumulating. Recently, only the timely discovery that a railroad bridge pier on the Kunshan-Xuzhou rail connection was in danger of collapse avoided a major disaster. One bridge had actually been built as early as 1904 and had been kept in service long past its reasonable operating life because there was no money to rebuild it. This is the state of affairs in the railway departments, and the situation is the same in the other communications departments. In Anhui, at the Yuxikou port company, another key node in the southward transport of northern coal, we learned that most of its machinery and equipment dates from the 1950's and that in February alone there were 311 hours of machinery and equipment down time. But many of the Shanghai marine transport office's coal steamers, which are responsible for three-fourths of Shanghai's coal transport, have served 20 or 30 years; the equipment is obsolescent, constantly needs repair, and is ready for replacement.

Rail transport prices are too low and the railways' savings are excessively small, limiting their self-renewal and self-development capabilities. Last year the Bengbu railroad branch office completed its empty car transfer and coal transport assignments with flying colors and received praise from the higher level leadership department and good ratings from the users, but the enterprise lost 23.419 million yuan. If transport prices are too low, they will inevitably have an additional effect, namely that the demand for passenger and goods transport will put pressure on the railroads and will further aggravate the rail transport crisis. Currently, the cost of coal haulage per ton-kilometer has been adjusted upward from 0.014 to 0.0175 yuan, but people still sigh that "100 or 1,000 li of coal transport by rail isn't as good a value of 1 li in a rickshaw."

To solve the problem of China's coal transport crisis, the state must take vigorous and effective measures for large-scale regulation of the departments, investments in energy resources and transport and communications be increased rapidly on a large scale without losing time, and in addition, prudent and appropriate adjustment of transport prices must be made; but many experts are calling for the concentration of coal production, transport, distribution, investment and construction in a national coordinating and command organization so that coal, electric power and transport will all be in balance and our limited transport capacities will be rationally and thoroughly utilized.

Shifting Focus of Electric Power Industry to Hydropower

40130094a Beijing SHUILI FADIAN [WATER POWER] in Chinese No 4, 12 Apr 89 pp 1-3

[Article by Zhang Quan [1728 0356] of the State Energy Resource Investment Company: "The Focus of the Electric Power Industry Should Be Shifted to Hydropower"]

[Text] Since 1988, after a period of improvement in coal supplies, more shortages have been announced and some thermal powered generators have shut down because of a lack of coal. Coal stocks also have fallen substantially. There was a one-third reduction in coal stocks for power generation in the winter of 1988 and spring of 1989 compared to the same period in 1987-88. This situation has made our 18-year-long power shortage even more severe.

Coal is China's main primary energy resource. Statistics for 1987 show that coal accounted for 86 percent of the electric power industry's fuel structure. Coal's dominance of fuels in the electric power industry will not change now or for a considerable period into the future. Thus, the coal situation will directly affect growth in the electric power industry. To deal with inadequate coal supplies and serious comprehensive shortages of electric power, we feel that we should use the coal supply situation to explore the necessity and prospects of developing hydropower.

I. The Coal Production Situation Is Very Good, But Acute Shortages Make Major Efforts To Develop Hydropower Essential

China's coal industry has grown substantially in the past few years, reaching a new stage on the order of every 2 years overall. Raw coal output surpassed 700 million tons in 1983 and 800 million tons in 1985, and reached 928 million tons in 1987. There was a relative lessening of the coal shortage for 3 consecutive years (1985-1987), but coal shortages have reappeared since 1988. What are the prospects for improvement in this situation?

Looking at the short-term coal production situation, raw coal output grew at an average annual rate of 50 million tons during the Sixth 5-Year Plan, with three-fourths of this amount coming from local coal mines. During the first 3 years of the Seventh 5-Year Plan, raw coal output grew at an average annual rate of only about 30 million tons, and there was a substantial reduction in the momentum of growth both in unified distribution coal mines and local coal mines. During the first 2 years of the Seventh 5-Year Plan, the state opened no new unified distribution coal mines and the pace of old mine abandonment speeded up. The appearance of new problems made it difficult for local coal mines to maintain the momentum of rapid growth after substantial development for several years. Projections are that the coal shortage will worsen during the early part of the 1990's. If we extrapolate on the basis of 8 million kW in newly installed thermal power generators (this is the level of installed generator startup for the past few years), we will need an additional 20 million tons or so of coal each year, meaning that about two-thirds of additional raw coal output will have to be used to assure power generation. Projections are that this is not very possible. If we use actual statistics for 1987, meaning that one-fourth of China's raw coal output goes to generate power, the capacity going into operation each year on the average will have to be pared by two-thirds.

From the perspective of medium-term coal plans, raw coal output will reach 1.4 billion tons at the end of this century, an increase of 440 million tons over actual output of 960 million tons in 1988. Electric power plans for the period 1989 to 2000, on the other hand, call for an additional 100 million kW in thermal power generators, which will require an additional 250 million tons or so in fuel coal, equal to 57 percent of the 440 million tons of additional raw coal output. This large proportion obviously is impossible, and it will be hard to compensate for such a large shortage even with conservation in many areas and increased efficiency of thermal energy utilization.

If we look at actual thermal power projects, a total of 158 large and medium-sized thermal power projects have been approved and established, and the additional power they generate will require 226 million tons of coal (not including small local mines and dedicated power plants). This includes an additional 92 million tons needed before 1990 and an additional 207 million tons before 1995. This corresponds to the plan to raise coal output to 1 billion tons in 1990, 1.2 billion tons in 1995, 1.4 billion tons in 2000. Using 1987 coal output of 928 million tons as a base number, China will lack 20 million tons of additional coal needed for power generation in 1990 and will require 76 percent of all additional coal output by 1995 to assure coal supplies needed for power generation. One can see that this will be impossible. With no further increases in projects now approved up to the year 2000, 48 percent (about half) of all the additional coal output will be needed to assure power generation. This means that, based on the 1.4 billion ton coal plan, practically no thermal power plant projects can be established prior to 2000.

This situation shows that inadequate coal supplies are an enormous drag on the development of thermal power. Overall, given a situation in which we do not have enough coal, cannot use petroleum, and have just begun nuclear power, the electric power industry will be forced to shift its focus gradually to hydropower in a major effort to exploit China's abundant hydropower resources and meet the urgent needs of our national economy.

II. Develop Hydropower According to Local Conditions, Combine Large, Medium, and Small-Scale Plants, Divide Them Into Three Levels

How can we make a major effort to develop hydropower? We feel that we should continue to adhere to the principle

of adapting to local conditions and integrating large, medium, and small-scale plants for development at three levels. This means that in "motherlode" regions, we should accelerate the development of hydropower base areas. Regions with hydropower resources and coal shortages should actively develop medium-sized hydropower. Rural areas should continue to develop small-scale hydropower.

A. Make a Major Effort To Establish Large-Scale Hydropower Base Areas in "Motherlode" Regions

In 1979, on the basis of existing river basin plans and survey and design work, the former Ministry of Electric Power integrated with electric power development and energy resource conditions in all areas to propose the idea of building 20 large-scale hydropower stations (since they may change during implementation, they actually include 25 large-scale hydropower stations) with a total scale of more than 31 million kW as the goal of struggle in hydropower construction during the Sixth 5-Year Plan to guide the development of hydropower preparatory work. The actual situation over the past 10 years has been that construction has begun at 11 power stations including the one at Gezhouba with a total scale of 9.7 million kW. Most of the other 10 projects are in the preparation for construction or initial construction stages. To date, among these 25 power stations, with the exception of 6 projects at Longtan, Dateng Gorge, Hei Shan Gorge, Pengshui, Mianhuatan, and Jinping where construction has not gotten under way, the total scale of the remaining 19 stations is 22 million kW and construction or preparation for construction has begun, an implementation rate of 95 percent. The implementation rate is 76 percent if we use the 25 stations for the calculations. By the end of 1988, seven power stations at Wujiangdu, Gezhouba, Bai Shan, Dahua, Longyang Gorge, Dong Jiang, and Lubuge have gone into full or partial operation with a total capacity of 6.13 million kW.

Looking back at practice over the past 10 years, it is both necessary and possible for hydropower development in the next 10 years to formulate a better plan to guide future work. For this reason, we should re-select a group of sites in hydropower resource "motherlode" regions and continue to make great efforts to develop large-scale hydropower base areas as the goal of struggle and focus of work for the next 10 years. These sites are reserve projects and include a total of 23 projects with a total scale of 41.66 million kW. The preliminary idea is for six projects on the middle and upper reaches of the Huang He with an installed generating capacity of 9.48 million kW; four projects on the Hongshui He with a total of 7.1 million kW; one project on the Dadu He for 2.8 million kW; four projects on the Wu Jiang for a total of 4.58 million kW; three projects on the Lancang Jiang for a total of 6.9 million kW; one project on the Yalong Jiang for 3 million kW; one project on the Qing Jiang for 1 million kW; one project on the Ting Jiang for 600,000 kW; one project on the Jinsha Jiang for 5 million kW; and one project on the Bailong Jiang for 1.2 million kW. At the same time, consideration should be given to building several pumped-storage power stations in north, east, northeast, south, and other areas of China.

The benefits from the Chang Jiang Three Gorges Project are obvious. The location is appropriate, development conditions are good, and it involves questions of equilibrium in energy resources for power generation over a rather wide range for a definite period. From the perspective of demand for energy resources and electric power, it should be built as soon as possible.

B. Actively Develop Medium-Scale Hydropower in Regions Which Have Water Resources But Not Enough Coal

China has abundant medium-scale hydropower resources. The results of a national power resource survey show that China has about 67 million kW in developable medium-scale hydropower. Only about 6.5 million kW had been developed by the end of 1988, less than 10 percent, so major potential awaits exploitation. The favorable conditions are:

1. Regional resource distribution advantages. South China has few coal resources but hydropower resources are generally rather abundant. Coal shortages are common in the 10 provinces of Zhejiang, Fujian, Jiangxi, Hubei, Hunan, Guangdong, Hainan, Guangxi, Sichuan, and Yunnan. Their net coal imports in 1980 were 33.18 million tons and grew to 51.02 million tons in 1987. These 10 provinces, however, have 38.82 million kW in developable medium-scale hydropower resources, 58 percent of the total in China. Only about 4 million kW had been developed up to the end of 1988, so there is great potential to exploit. It requires conscientious preparatory work, optimum choices, and rational development, and it can compensate to a certain extent for inadequate coal supplies and reduce the electric power shortage.

2. It has advantages of being "short, smooth, and quick." The scale of medium-size hydropower is appropriate, and it has the obvious advantages of short construction schedules and rapid results. Preliminary analysis of actual data by the Hydroelectric Power Engineering Society indicate that among the 69 medium-scale and 25 large-scale hydropower stations built from the 1960's to the 1980's, medium-scale hydropower (mainly less than 50,000 kW) had a unit investment of 1,291 yuan/kW and a power generation schedule of 3.8 years. The unit investment in large-scale hydropower was 1,103 yuan/kW and the power generation schedule was 7.9 years. Statistics for 15 large and 6 medium-scale hydropower stations now under construction indicate that the investment was 1,769 yuan/kW for the medium-scale projects and 1,521 yuan/kW for the large-scale ones. Medium-scale hydropower stations have a unit investment per kW 20 percent higher than large-scale stations and a startup schedule 50 percent shorter than large projects.

3. We have the advantage of local initiative. At the end of 1988, China's total installed hydropower generating

capacity was about 32.4 million kW. The proportions for large, medium, and small-scale were, respectively, 43 percent, 20 percent, and 37 percent. The first and last are large, but the middle one is small. The reasons for the slow development of medium-scale hydropower are, of course, multifaceted, but capital shortages continue to be the primary cause. The state has limited financial resources and they are focused on assuring large-scale projects, making it hard to consider medium-scale projects. Motivated by the policy of central authorities of "supportive profit concessions," localities have built a great deal of small-scale hydropower but they have not become involved in medium-scale hydropower. The enthusiasm of local areas for building medium-scale hydropower will grow as coal and power shortages intensify and local economies gradually become stronger.

To accelerate the development of medium-scale hydropower, strategic deployments should focus on the 10 coal-short provinces of south China. They should concentrate on local areas for construction and management and the state should provide the required financial support. Optimum development choices should be made for planning and site selection, and we should be concerned with economic results.

C. Develop Small-Scale Hydropower in Rural Areas

The relevant departments have been somewhat more concerned with this issue. Some comrades have scientifically summarized fresh experiences over many years and they have done special research which does not require detailed description.

III. Rely on Reforms and Policies, Rely on Technical Progress, Promote Major Development of Hydropower

A. Open Up Routes, Implement Capital Sources

Increasing the installed hydropower generating capacity by 50 million kW in 12 years will require raising 150 billion yuan in capital, an average of more than 12 billion yuan per year. This is not a small sum and it must be conscientiously implemented. Besides state investments, we also must open up routes and fully motivate initiative in all areas for hydropower construction. To achieve this, we first of all most motivate local initiative for joint investments to develop hydropower. In the area of integration, we should integrate resources and markets to expand the scope of integration. An example is the pattern used for joint development of the Tianshengqiao Hydropower Station by Guangdong, Guangxi, Guizhou, Yunnan, and the state. This arrangement should be thoroughly explored and extensively extended. Second, we must motivate initiative in all departments for comprehensive utilization projects and formulation of investment sharing policies. Third, there must be rational price increases for electricity supplied to grids, reductions in tax rates, fewer types of taxes, and so on.

B. We Must Truly Strengthen Preparatory Work

The time period required for preparatory work for hydropower construction is rather long and involves substantial costs. Preparatory work now cannot keep pace with the needs of development, and this is particularly prominent regarding the issue of medium-scale hydropower. Thus, we must have a division of levels of responsibility from the state to local areas for a major effort to organize forces in the areas of capital, survey, and design. Effective measures must be adopted in project selection and arrangement, design and management reforms, and other areas for greater motivation.

C. Truly Solve Population Resettlement Questions

Resettlement from a reservoir is a major problem in hydropower development since it concerns agricultural production and the personal interests of those resettled. Past practice has shown that existing state policies are incapable of perfectly arranging for the resettlement of people from a reservoir area. Following price increases and readjustments in rural policies over the past few years, several new problems have appeared. Some provinces and regions have formulated some preferential policies to deal with real local conditions. All these new situations require comprehensive study and readjustment of existing policies and stipulations. Thus, we must conscientiously summarize experiences and problems in this area, formulate new reservoir resettlement policies capable of adapting to medium-term plans and development, and promote the development of hydropower construction.

D. Make Rational Readjustments in Taxation Policies for Hydropower Projects

There should be exemption from the cultivated land occupation tax, for example, similar to railways, airports, water conservancy projects, and other public social activities. However, they are strictly collected for hydropower stations and land inundated by reservoirs. The amount of taxes to be paid for this item in projects now under construction or those where construction is to begin soon is 3 to 4 billion yuan, which greatly increases the burden on state investments.

E. Rely on Scientific and Technical Progress

There should be clear technical policies and goals for the civil engineering which restricts construction schedules and costs for hydropower stations. An example is the extensive research, extension, and utilization of advanced technologies and management methods like local materials dams, rolled concrete dams, face-plate stone-fill dams, rapid tunneling of large-diameter underground tunnel projects, and so on which have proven effective in China over the past few years. This would accelerate the pace of scientific and technical progress, continually improve design, construction, and management levels, and promote even greater development of hydropower construction.

Deepening Reform, Accelerating Hydropower Planning and Design Work

40130087 Beijing SHUILI FADIAN [WATER POWER] in Chinese No 3, 12 Mar 89 pp 1-2

[Article: "Reinforce Water Resources and Hydropower Planning and Design Work via More Intensive Reform—The 1989 National Water Resources and Hydropower Planning and Design Work Conference Meets in Beijing"]

[Text] With approval by the Ministry of Energy Resources and Ministry of Water Resources, the Water Resources and Hydropower Planning and Design Management Bureau convened the 1989 National Water Resources and Hydropower Planning and Design Work Conference in Beijing from 16 to 20 January 1989. The 157 participants in the meeting included directors and CCP committee secretaries from design academies under the two ministries, directors of river basin organ design academies and provincial (municipal and autonomous region) design academies, responsible comrades from various river basin organ and provincial (municipal and autonomous region) water resources and hydropower offices (and bureaus), and leading comrades from the Ministry of Water Resources, Ministry of Energy Resources, State Planning Commission, Ministry of Construction, State Energy Resource Investment Company, China International Engineering Advisory Company, and other relevant departments. Minister Yang Zhenhuai [2799 2182 2037] of the Ministry of Water Resources, Minister Huang Yicheng [7806 3015 6134], Vice Minister Lu Youmei [7120 0147 2812] and Senior Hydropower Engineer Pan Jiazheng [3382 1367 6927] of the Ministry of Energy Resources, and Senior Engineer He Jing [0149 3878] of the Ministry of Water Resources spoke at the meeting. The conference summarized and exchanged work conditions in 1988 according to the spirit of the National Planning Conference and System Reform Conference. It clarified the tasks of water resources and hydropower construction for a period into the future, and it arranged work for 1989.

The primary tasks of water resources work for a period into the future based on the requirements of attaining gross national grain output of 500 million tons and quadrupling the gross value of industrial output by the year 2000 are: 1) Improving the flood prevention capabilities of primary river segments in the middle and lower reaches of China's major rivers to prevent flooding on the largest scale which has occurred during this century. 2) Using a long-term, strategic view to formulate water resource development and utilization policies and making major efforts to encourage water conservation and planned water use. 3) Striving to reduce water resource shortages in key water-short regions of north China and basically solving the water supply problems of water-short coastal cities and the human and livestock drinking water problems of agro-pastoral regions. 4) Actively joining together with agricultural, forestry, and other relevant departments to promote soil conservation and bring the area of preliminary control up to near 50 percent. 5) Perfecting the matchup of existing farmland irrigation facilities and expanding the irrigated area from the present 720 million mu to 800 million mu. In the area of hydropower construction, we must place 32,000 to 36,000 MW in large-scale installed hydropower generating capacity and 14,000 MW in medium and small-scale hydropower generating capacity into operation within the next 12 years, which means that our 18,800 MW scale now under construction will be the foundation for starting new construction of 45,000 MW. The work tasks for the next 7 years are to do feasibility research for 60,000 MW and preliminary designs for 85,000 MW, including completion of all the feasibility research and completion of preliminary designs for 60,000 MW. The focus of preparatory work for this period is: 1) Continuing preparatory work for the hydropower "motherlode" on the trunk and tributaries of the upper and middle reaches of the Chang Jiang, the upper reaches and northern trunk of the Huang He, the Hongshui He, Lancang Jiang, and so on, and for 20 key large power stations. 2) In regions with serious power and coal shortages, urgently arranging for preparatory work for certain medium-sized hydropower projects with superior indices, good results, and quick benefits. 3) Strengthening planning and site selection work in east, north, northeast, southeast, and other coastal regions of China and in power grids which have a relatively large proportion of thermal power, and working quickly to select several pumped-storage power stations and urgently develop preparatory work.

On the basis of clarifying the strategic goals of water resource and hydropower development in the medium and short term, the conference studied and made deployments for water resources and hydropower planning and design work in 1989. In the area of water resources, on the basis of the requirements placed on water resources construction by socioeconomic development in China, we should continue to focus on compiling river basin plans, regional water resources plans, and special water resources plans, and on feasibility research and preliminary designs for all types of engineering projects. The overall requirements are to seize opportunities, strive to do more preparatory work earlier, and make an effort to fill out our reserves. This concerns strategic deployments for planning work for large rivers and the transfer of water among river basins, and we must focus on it and do it well. In actual arrangements, the focus should be on our seven major rivers, with wide-ranging development of river basin planning work and the corresponding evaluation work. The state should evaluate the Hai He Plan, and there should be internal ministry evaluations of the Zhu Jiang [Pearl River] Plan, Chang Jiang Plan, Liao He, Huang He, and Huai He Plans, and the plan for the eastern line to transfer water from south China to north China. Evaluations of the Hei He (in Qinghai, Gansu, and Inner Mongolia), Gan Jiang, and several other river basin plans should be organized in accordance with the Water Law. In the area of design, our foundation should be good plans for selecting near-term

projects, active development of work, and early filling out of reserves. Technical designs have already been started for Xiaolangdi. Many special documents must be submitted and the tasks are rather heavy. The feasibility and preliminary designs for water diversion projects like the one to divert water from the Huang He into the Dian He, diverting the Juma He to near Beijing, and others should be evaluated. Feasibility reports for the Zipingpu and Baise key water conservancy projects should be completed during 1989. If we wish to be able to decide on a development pattern for the section of the river in Hei Shan Gorge during 1989, we should focus on intermediate reports and research. Moreover, we should do feasibility research on key water conservancy projects, including Linhuaigang on the Huai He, Shapotou in Ningxia, and Baishige in Liaoning, and on the New Huai-Hong He, and other projects. We also must prepare preliminary designs for the reservoirs at Taolinkou in Hebei and Shitange in Yunnan, expansion of the Zhongyun He, the Hong Hu flood prevention and floodwater storage projects, and others.

In the area of hydropower, we must continue to develop research on strategic deployments for hydropower development and policies for development of the hydropower industry. We must continue and complete work to compile hydropower development plans for major rivers and river sections, focus on survey and design for large and medium-scale projects, and place 10,000 MW of medium-scale hydropower stations into operation before the year 2000. We should focus on preparations for preliminary work and quickly complete technical implementation designs for projects under construction and competitive bidding designs for new projects. The concrete arrangements are, in the area of planning, we plan to complete the Jianxi and Yuan Shui Plans in 1989, and we plan to complete feasibility research plans for the Xiangshui Ravine pumped-storage project and for the Shidi, Xilin, Dachao Shan, Xiaowan, and other projects. We will continue working on the Zhanghe Bay pumped-storage project and on the Xiangjiaba, Xiluodu, Jinping second level, Miaojiaba, and other projects. We plan to complete preliminary designs for the Tianhuangping pumped-storage project, Zhikong, and others, and we will continue working on the Yele, Hongjiadu, Laxiwa, and other projects.

For comrades at the meeting, whether we are speaking of medium and short-term water resources and hydropower development strategies and goals, or of planning arrangements for 1989, their tasks now and in the future will be extremely arduous. The most prominent problem is that we have too few water resources and hydropower design project reserves and insufficient capital for preparatory work, and the situation is somewhat serious. The solution is conscientious adherence to the spirit of the 3d Plenum of the 13th CPC Central Committee, a focus on controlling the economic environment, reorganizing economic procedures, and favorable opportunities for more extensive reforms, doing earnest propaganda concerning adherence to and implementation of the Water Law, gradually taking the road of legal controls over water, opening up new channels and new routes for preparatory work expenditures during reforms, motivating initiative in all areas, raising capital from many sources, and doing good water resources and hydropower preparatory work. All survey and design units should implement more extensive internal reforms and develop gradually in the direction of becoming enterprises and socialization. We should expand the functions of design units and strive to advance toward multiple functions. We should reinforce construction of basic activities, promote technical progress, improve the quality of all personnel, improve technical equipment levels, increase competitive ability and the capacity for self-development, contribute to even greater development of the cause of water resources and hydropower in China, and commemorate the 40th anniversary of the founding of China with special achievements.

Session of Leading Group for Three Gorges Project Demonstration Held

40130094b Beijing SHUILI FADIAN [WATER POWER] in Chinese No 4, 12 Apr 89 p 4

[Article: "The Three Gorges Project Demonstration Leadership Group Holds Its 10th (Enlarged) Meeting and Approves in Principle the Chang Jiang Three Gorges Key Water Conservancy Project Feasibility Research Report"]

[Text] Demonstration work for the Three Gorges Project which lasted for 2 years and 8 months after the CPC Central Committee and State Council issued Document No 15 in June 1986 has now concluded. On the basis of demonstration achievements by 14 expert groups, the Chang Jiang Basin Planning Office revised the "Chang Jiang Three Gorges Key Water Conservancy Project Feasibility Research Report (Discussion Draft)." The task of the 10th (enlarged) meeting of the demonstration leadership group was to discuss this report.

The meeting opened on 27 February 1989 and lasted for 8 days. A total of 198 people attended the meeting, including members of the leadership group, specially-invited advisers, three chairmen of the boards of associations, advisers from the 14 expert groups, group directors and deputy directors, heads of work groups and liaison personnel, comrades from relevant units and localities, and comrades from news units in Beijing. The meeting heard the report of Senior Engineer Wang Jiazhu [3769 1367 2691] of the Chang Jiang Basin Planning Office and held a full-conference discussion after reading the feasibility research report (discussion draft). On the basis of statements to the meeting, the leading group and relevant comrades held centralized discussions. The discussions at the meeting were extremely lively and the specially-invited advisers, Chinese People's Political Consultative Conference members, leading comrades from provinces and regions, chairmen of the boards of associations, and members of the leading group attending the meeting made important

statements. It can be said that this conference fully embodied the spirit of democratization and science.

The delegates stated during their speeches that a great deal of work had been done for demonstration of the Three Gorges Project over the past 2-plus years. The basis for the demonstration work was the many survey, design, experiment, and research achievements made by various departments and units over the past 30-plus years; the important achievements by the State Planning Commission and Science and Technology Commission in organizing water level demonstrations during the previous stage; the many achievements in attacks on key S&T problems by the State Science and Technology Commission in conjunction with demonstration work organizations; and the supplementary survey, experiment, research analysis, and survey design achievements made over the past 2-plus years under direct support or guidance by the various expert groups. The demonstration work was serious, earnest, and comprehensive, and the achievements in the demonstrations are valuable wealth for the state. The discussion report (draft) submitted to the meeting by the Chang Jiang Basin Planning Office was re-compiled on the basis of the special topic demonstration reports by the expert groups and a large amount of data accumulated over more than 30 years. During the meetings, most comrades felt that this report basically summarized and outlined the achievements of the 14 topical demonstration reports, described the status and role of the Three Gorges Project in the Chang Jiang Basin Comprehensive Plan and in the development of the entire national economy and electric power, and showed the technical possibility and economic rationality of building the Three Gorges Project. For this reason, they approved this report in principle and proposed that after some supplementation and revision, it should be submitted to the state as a basis for macro-level policymaking. Some comrades, however, felt that this report was not sufficiently complete and clear and could not serve as a basis for macro-level policymaking. They did not agree with the conclusions of the report. Based on the views of the majority of comrades, the demonstration leadership group decided to approve in principle the feasibility research report (discussion draft). They also called for the Chang Jiang Basin Planning Office to make the necessary supplementations and revisions and asked that it be submitted to the State Council after discussion by the leading group.

Regarding the question of the proper time to build the Three Gorges Project, most delegates began with development strategies for national construction, the need for flood prevention, energy resources, shipping, and water supplies, and the enormous economic benefits of the Three Gorges Project. They felt that excessive delays would cause major losses and even greater difficulties, and proposed that the state make arrangements as soon as economic conditions permit. Some delegates felt that, given the current situation of reorganization of economic procedures, controlling the economic environment, and reducing the scale of capital construction, they should not advocate early construction because of the large scale of the Three Gorges Project, the concentrated investments, and the fact that it would not produce benefits before the year 2000.

The renewed demonstration of the Three Gorges Project clarified the necessity and feasibility of building the Three Gorges Project from the perspective of technology, resettlement, the ecological environment, economics and finances, and other areas, and they provided a scientific basis for use when the state decides whether or not to build it and the advantages of building it soon or later. The question of whether or not the Three Gorges Project will be built and whether it will be built soon or later awaits the State Council Examination Committee to make the final decision based on the strategic plans and deployments for development of the national economy, the state's financial and economic situation, achievements in reform, opening up, and control, and comprehensive research which takes into account the overall situation.

Harnessing the Chang Jiang River Basin in a Comprehensive Way

40130086 Beijing BEIJING KEJI BAO in Chinese 1 Mar 89 p 3

[Article by Lin Hua [2651 5478]]

[Text] I. China is a big hydropower nation and the world champion in hydropower resources. We have theoretical reserves of 600 million kW and surveys indicate that 370 million kW is developable. Our reserves are concentrated mainly in southwest China in Sichuan, Yunnan, Guizhou, and Tibet, and in the three provinces and autonomous regions of Qinghai, Gansu, and Ningxia in the upper reaches of the Huang He. With the exception of Tibet, which cannot be developed in any significant way for the time being, at least 260 million kW can be developed but less than 5 percent has been completed and placed into operation to date.

Although China is rich in coal resources, they are basically concentrated in north and northwest China. Moreover, developing them will require large investments. We have been developing them for some time, but we still must build railroads. Some have calculated that the cost of thermal power (including investments in coal mine extraction and railways) is double that of hydropower, and it causes severe environmental pollution.

After the establishment of the Ministry of Energy Resources, the Coal Corporation proposed developing more hydropower to reduce pressures on coal. Moreover, when certain thermal power plants in Sichuan Province now under construction go into operation, they will have to ship in 7.4 million tons of coal annually. Comrades in Sichuan say they have a power shortage today and that tomorrow a coal shortage will become a foregone conclusion.

These situations show that all areas now have a better appreciation of the importance and necessity of developing China's hydropower.

II. Under the principle of unified planning, harnessing the Chang Jiang river basin should first involve developing and controlling upstream tributaries. Outstanding achievements have been made in developing the upper reaches of the Huang He and they are successful experiences. The upper reaches of the Chang Jiang, on the other hand, receive more precipitation and have a greater slope, so it is a more favorable region than the Huang He. Single power stations on many tributaries like the Wu Jiang, Yalong Jiang, Min Jiang, and Dadu He are in the several 100,000 kW to 2 or 3 million kW range. The basin covers a vast area, so the number of people resettled and the area of cultivated land inundated per kW is much smaller. The construction cost per unit kW also is much less, and is equivalent to the cost of building a thermal power plant in this region.

The smaller scale involved also makes for shorter construction schedules. At the Manwan Hydropower Station (1.25 million kW) on the Lancang Jiang and the Dongfeng Power Station (540,000 kW) now under construction on the Wu Jiang, for example, just a little more than 2 years was required to divert the flow by the winter of 1987, the first generator at both stations will begin generating power in 1991, and they will be entirely completed in 1993. This type of sustained investment and sustained startup and power generation is better suited to China's current economic development needs than is the method of regional resource integration to develop the economy, and it conforms to objective reality.

III. Starting with the concept of flood prevention also shows that beginning upstream is better for the overall situation. In October 1987, while the Chinese People's Political Consultative Conference Economic Construction Group was meeting with over 10 experts in the Sichuan Province Political Consultative Conference to survey the flooding situation from 1870 to 1981 at Chongqing, Beibei, and Hechuan, they personally viewed the sign marking the floodwater level in 1981. Local comrades said that "all one-story buildings in Beibei were flooded and one-third of Hechuan County was covered. Most farmland was inundated and Sichuan as a whole suffered losses totaling about 2 billion yuan." The water level during the 1870 flood was 4 meters higher than the 1981 flood. Only one corner of the Hechuan county seat was not flooded and the losses were extremely serious. These conditions make it very hard to support the statement that "upstream floodwaters regress easily." Flood prevention in the upper, middle, and lower reaches of the Chang Jiang should be viewed from the perspective of comprehensive control. We should begin by planting grass and trees for ecological control on the upper reaches. There is frequent flooding in the Jialing Jiang river basin, but construction of two key hydropower projects at Tingzikou and Huatan could prevent floods which occur at a frequency of once every few decades at Hechuan, Beibei, and Chongqing. Gradual cascade development and comprehensive control of the Jinsha Jiang, Yalong Jiang, and Dadu He would permit basic control of flooding and expand the irrigated area in Sichuan Province, and it could reduce the danger of flooding for Wuhan City and the Jianghan Plain. It also could raise the water level in shipping channels on the rivers by 1.5 to 3 meters during dry seasons. This would substantially benefit shipping. Better forests and vegetation at the headwaters and cascade reservoir construction could substantially reduce silt.

IV. Cascade hydropower development is much better than developing individual power stations. A large key reservoir would be even more beneficial. It could increase generator operating time to 5,000 to 6,000 hours and provide a guaranteed output of more than 50 percent of installed generating capacity (this figure is only one-fourth at the Gezhouba Project and under one-third at the Three Gorges Project). Capital construction costs also could be reduced by 20 percent and construction schedules would be 20 to 30 percent shorter. Hydropower experts call this a large cascaded flow.

V. Surveys report these conditions on the upper reaches of several rivers and tributaries:

1. A total of 14 cascade hydropower stations at about 15 million kW are planned from Longyang Gorge in Gansu to Qingtong Gorge in Ningxia on the upper reaches of the Huang He. They include four hydropower stations with 1.2 million kW at Liujia Gorge, 400,000 kW at Yanguo Gorge, 180,000 kW at Bapan Gorge, and 270,000 kW at Qingtong Gorge which have been operating for 15 to 18 years. Part of Longyang Gorge is operating and Lijia Gorge (2 million kW) is under construction.

Development of the upper reaches of the Huang He has produced extremely obvious economic benefits. A substantial part of national output from the high energy-consuming aluminum, lead, zinc, copper, nickel, iron alloy, and carbon industries is produced there. The petrochemical, chemical fertilizer, light, and textile industries are just beginning to unfold there. Gansu Province has become northwest China's major industrial province. The Qingtong Gorge Key Hydropower Project has provided substantial reserve strength for the ancient Qin, Han, and Tang Dynasty canals. Grain yields per mu now exceed those in the Jiangnan region [area south of the Chang Jiang] and trade markets are extremely lively. The hydropower industry also has promoted development of electrolytic aluminum in Qinghai. The 200,000 ton Golmud Potash Fertilizer Project is now operating and a 1 million ton oil refinery is under construction. Emerging industries are now taking shape in Haixi Autonomous Prefecture.

Hydropower station development on the upper reaches of the Huang He also has propelled economic development in the river basin and could become a model for development of the Chang Jiang.

2. Nine cascade hydropower stations could be developed on the Wu Jiang in Guizhou Province from Hongjiadu to Pengshui and Daxikou for a total of 8.56 million kW at a total investment of about 10.8 billion yuan, less than the cost of resettling 720,000 people in the Three Gorges Project. Only 119,530 people would have to be resettled to develop the Wu Jiang river basin, less than one-sixth the number resettled in the Three Gorges Project. This is less than one-third the amount in the Three Gorges Project in terms of unit installed generating capacity. Moreover, with joint development of energy and resources, it could create job opportunities and bring prosperity without requiring other arrangements.

Since the 630,000 kW Wujiangdu Hydropower Station began operating, a 120,000 ton aluminum plant, China's biggest, has been built and another 80,000 tons in capacity is under construction. It also has provided part of Chongqing City's power needs. The 510,000 kW Dongfeng Hydropower Station is under construction, and the next goal is the 540,000 kW key power station at Hongjiadu. This would permit expansion to 420,000 kW at Wujiangdu to provide a total installed generating capacity of 1.05 million kW there.

Resource development motivated by cascade development of Wu Jiang hydropower would become an economic advantage. It would bring prosperity to Guizhou Province, particularly from the aluminum and phosphate fertilizer which could support all of China.

3. The good conditions for developing the Lancang Jiang in Yunnan are found in few other places in China. A total of 13.70 million kW of hydropower could be developed in eight cascades on the middle and lower reaches for a total investment of about 16.4 billion yuan. Only 58,000 people would have to be resettled, just one-tenth the number in the Three Gorges Project. Moreover, there is considerable enthusiasm for hydropower development in Yunnan and Guizhou Provinces. It would not require expenditures by central authorities on resettlement, and it would encourage the raising of capital for input in hydropower construction. At the Manwan Hydropower Station now under construction, for example, Yunnan Province invested 300 million yuan first, equal to 29 percent of the total investment. Moreover, the best people were chosen to support construction, the entire province was mobilized to provide support, and the results of bid solicitation and contracting responsibility were very good. Work has been under way for 3 years and diversion of the flow was completed in December 1987, 1 year ahead of schedule. It is expected that one or two 250,000 kW generators will begin operating in 1991. Preparatory work is now proceeding with urgency for 3.6 million kW at Xiaowan and 1.25 million kW at Dachao Shan.

After Guangdong Province realized Yunnan's advantages for power development, it discussed and signed a joint investment agreement in Kunming in 1988 to develop Yunnan's hydropower and thermal power and transmit power to Guangdong. It will accelerate development of the middle and lower reaches of the Lancang Jiang to within 20 years instead of 30 years. This would enable Yunnan Province to develop its biggest resource advantage, hydropower (71 million kW), and open a way to create wealth for developing phosphate fertilizer, nonferrous metals, agriculture, and tropical crops. It also could provide electric power to support Guangdong, which would improve China's status for recovering Hong Kong. There can be benevolent cycling of nonferrous metals and other energy-laden products.

4. Longzui Hydropower Station on the Dadu Jiang in Sichuan Province has begun operating. The flow was diverted for the 600,000 kW Tongjiezi Hydropower Station in 1987 and it may generate power by 1991-1992 and supply it locally to the Chengdu area. Preparatory work is now under way for the 2.8 billion kW Baobu Gorge project and construction may begin during the Eighth 5-Year Plan. Construction has begun at the 3 million kW Ertan Hydropower Station on the Yalong Jiang and preparatory work has gotten under way for the 3 million kW first and second levels at Jinping. It will be most beneficial when matched with development of vanadium, iron, and carbon-iron ore in western Sichuan. The 15 billion m^3 of water in the Ertan and Jinping second-level reservoirs will control some floodwater.

The primary benefits from the Baozhusi Hydropower Station now under construction and the preparatory work now under way to develop the Tingzikou and Huatanzi key projects on the Jialing Jiang would be in flood prevention, shipping, and irrigation, and it could reduce Chongqing's power shortage.

Preparatory work is now under way for 5 million kW at Xiangjiaba and 10 million kW at Xiluodu on the Jinsha Jiang. Construction may begin during the Eighth and Ninth 5-Year Plans, and they would begin generating power in the next century. This would begin the transmission of power from west to east and provide the first support for the central China region.

VI. Integrate hydropower and mineral resources, give play to regional economic advantages. The upper reaches of the Chang Jiang and the upper reaches of the Huang He have abundant hydropower resources. They also have abundant ferrous and nonferrous metals, phosphate ore, and other raw material resources, and joint development of both these things could make use of economic advantages. On the one hand, high energy-consuming commodities, aluminum, nickel, carbon, iron alloys, calcium carbide, yellow phosphorous, and other things could support the entire nation. On the other hand, it could develop the region's economy and bring prosperity to our poor brother nationalities. Successful experiences from the upper reaches of the Huang He can serve as models. Gansu is the most prominent one. Qinghai and Ningxia are now building big aluminum plants, and the light and textile industries are moving forward with urgency.

Hydropower development has already gotten under way in Guizhou's Wu Jiang river basin and Yunnan's Lancang Jiang river basin. Preliminary results from development of aluminum, phosphate, calcium carbide, and iron alloys may be seen during the Eighth 5-Year Plan and economic development of the river basin is brewing now. It will play an even greater role after the year 2000.

Sichuan has great potential in hydropower, mineral resources, industry, and agriculture. Completion of the hydropower stations now under construction could increase economic benefits by several billion yuan and the value of output by 20 to 30 billion yuan. There is rather substantial potential and reserve strength for transmitting west China's power to east China.

Renewed debate about the Three Gorges Project has gone on for 2 years now. Delay of the Three Gorges Project has allowed construction to begin on at least 9 million kW in several hydropower stations at Geheyan on the Qing Jiang, Wuqiangxi on the Yuan Jiang, Ertan on the Yalong Jiang, Lijia Gorge on the Huang He, Manwan in Yunnan, Dongfeng on the Wu Jiang in Guizhou, and others, and they may begin generating power within 3 to 4 years, 5 to 6 years, or 7 to 8 years. Moreover, when integrated with nearby industries, the economic results obtained would serve the four modernizations drive. Efforts to develop the hydropower sector conform to China's real conditions and national interests.

Giant Ertan Project Proceeding on Schedule

40100050b Beijing XINHUA in English 0322 GMT 15 May 89

[Text] Chengdu, May 15 (XINHUA)—The first phase of construction on China's biggest hydroelectric project—the Ertan power station—is proceeding according to schedule.

The Ertan power station is located on the lower reaches of the Yalong River in Sichuan Province, 40 kilometers from Panzhihua City. Its total installed capacity is 3.3 million kilowatts, with a proposed annual production of 17 billion kilowatt-hours.

The station is the largest and most complex hydropower project ever attempted in China.

Experts believe the power station has exceptional potential because the amount of water discharged from the Yalong River exceeds that of the Yellow River, and will provide high yields of low-cost electricity.

According to its plan, the station will be completed and start operation in 1997, which will greatly ease the grave power shortage of Sichuan Province and promote the development of mineral resources in the areas of Panzhihua City and Xichang.

Construction work has been going smoothly since its first phase began in 1987. A 45-kilometer highway is now 80 percent completed and a suspension bridge built over the Yalong River is now in use.

Some 3.5 kilometers of channels were also completed during the first phase of construction, and transmission lines and microwave telecommunication facilities are expected to be finished by the end of this year.

Money for the project is provided by the central and local governments, aided by foreign capital. Domestic and overseas tenders are being invited for the station's remaining construction work. The principal project will call for tenders in October.

Survey and Design Work on Gongboxia Continues

40100052a Beijing CEI Database in English 29 May 89

[Text] Xining (CEI)—Survey and design work will soon start on the Gongboxia power station, the fourth of the chain of power stations along the upper reaches of the Yellow River, is now under its preparatory stage.

The power station, with a designed height of 133 meters, borders on Xunhua and Hualong counties in Qinghai Province. The station will have an installed capacity of 1.5 million kilowatts and an annual generated energy of 5 billion kWh after it is completed.

The project, with a time limit of 8 years, will be invested with a total of 1.942 billion yuan.

Besides power generation, the station can also be used for irrigation and water supply.

The other three power stations are Longyangxia, Lijiaxia, and Laxiwa, with a respective installed capacity of 1.2 million, 2.0 million, and 3.72 million kilowatts.

Construction at Shidongkou Plant in Full Swing

40100049 Shanghai SHANGHAI FOCUS in English 8 May 89 p 1

[Article by Cao Yong]

[Text] The Shanghai Shidongkou Second Power Plant, which contains two super-critical generators that can supply one third of the city's electricity consumption, is ranked by the city government as one of its key projects this year.

Infrastructure improvements at the plant started early last year. They are designed to safeguard the installation of equipment during the second half of this year to fulfill the schedule to supply electric power by the end of next year.

Chen Jingzhong, president of the Shanghai Branch, Huaneng International Power Development Corporation, which is in charge of the project, said it is the largest in which the corporation has ever been engaged.

Chen said that the project will not only ease the city's shortage of energy, but will also introduce to China new manufacturing and design techniques for super-critical generators.

The two super-critical generators, he said, can save about 5 percent of the coal used by traditional sub-critical generators. So, although construction of the plant costs a little more than traditional ones, the Ministry of Energy has demanded that it proceed. This plant, according to the ministry, can play an exemplary role for China's power industry.

The corporation and the city government are each bearing half the cost of the total investments of 2.4 billion yuan (about $642 million), Chen said.

Most of the plant's equipment has been imported. The boilers, for instance, are from American Combustion Engineering; the Swedish firm, Sulzer Brothers; and other Western companies.

The corporation and the city government have also encouraged improvements in China's abilities in the construction of power stations. Since the project began, they have demanded that foreign and domestic companies co-operate in making some of the equipment locally.

As a result, some of the foreign companies have contracted with domestic manufacturers to make the equipment. Nearly $50 million worth of the equipment needed by the project has been made by local factories.

The plant was designed by the American Sargent Lundy Corporation, which was established in 1891. This is the first power plant that firm has designed for China. The Eastern China Electric Power Designing Institute sent some of its staff to the American company to help during the design process and to study advanced design techniques. The institute has also imported some computer equipment for electric power station design.

The first phase of the project contains two 600,000 kilowatt super-critical generators. The first generator will go into operation by the end of next year, and the second one will begin work by the end of 1991, Chen said.

The plant has also left space for the future establishment of two more such generators, Chen said.

Coal Still in Short Supply Despite More Output

40100052f Beijing XINHUA in English 0057 GMT 29 May 89

[Text] Beijing, May 29 (XINHUA)—China's coal shortage will remain a serious problem even though the country's coal output this year should reach 1 billion tons, an increase of 30 million tons over last year.

The increase will only meet the demand from the expanding power and steel industries, which will respectively need 24 and 5 million tons more, according to the Ministry of Energy Resources.

But other sectors, such as the railways, chemical, and metallurgical industries, and home heating, will be short as ever and continue to cry out for more coal, a coal corporation spokesman said earlier this month.

The spokesman blamed the shortages on rapid industrial expansion—triple the rate of increases in coal production.

The shortages have also affected coal exports, which at 3.6 million tons for the first four months of the year were 4 percent lower than last year, according to the Chinese General Administration of Customs.

Shanxi Province, China's largest coal producer, has had frequent power-cuts because local power plants just don't get enough coal, which is sent to other parts of the country, a CHINA DAILY report said today.

It says that the province produces one-third of the coal exports. In the first four months of this year, it turned out 75.12 million tons of coal, 8.1 percent more than last year.

Energy shortages and increased domestic demand have caused exports to drop. Yet the province is still expected to fulfill its state coal export quota for the first half of the year.

Ironically, power shortages have forced many coal mines to reduce operations and work four days a week.

Coal mines haven't been able to get enough steel from central planning,either. About 30 percent of their steel needs have had to be bought on the open market at exorbitant prices, the report says.

Coal Shortage Having Dire Impact on Economy of East China

40130089b Shanghai JIEFANG RIBAO in Chinese 9 Apr 89 p 1

[Article by reporter Zhang Zhiyuan [1728 1807 6678]: "Coal Shortage Shuts Down Advanced Power Equipment at Baogang Steel Mill, a Disturbing Phenomenon Which Affects Economic Construction and Endangers Power Grid Safety in East China"]

[Text] A 350,000 kW generator at the Baogang Reserve Power Plant was forced to shut down recently due to the coal shortage.

I visited Zhang Liquan [1728 4409 6898] in the chief engineer's office at the East China Power Management Bureau on 8 April 1989 concerning this event. He stated that the Baogang Power Plant has two generators, each with an installed generating capacity of 350,000 kW. Because the second stage of the Baogang Project was never put into full operation, the amount of power now being used at Baogang is about two-thirds of the output capacity of one generator. These two generators produced a total of 4.9 billion kWh of power in 1988, of which 3.1 billion kWh was transmitted to Zhejiang, Shanghai, Jiangsu, and Anhui via the East China Grid. It has become an indispensable part of power needs for industrial and agricultural production and for the people's lives in these three provinces and municipality.

The state allocated 1.75 million tons of coal for power generation at the Baogang Power Plant in 1988, but Shanxi's coal mines actually shipped only 1.323 million tons to the transfer port at Qinhuangdao, a mine transfer rate of 75.6 percent. This forced the Baogang Power Plant to dip into its reserves during 1988 for more than 400,000 tons of coal. The mine transfer rate to the Baogang Power Plant dropped again to 61.5 percent between 1 January and 20 March 1989. Industrial and agricultural production in the East China region is China's most efficient. Without coal, there is no power, and without power no economic benefits can be created. The generator shutdown at the Baogang Power Plant has directly reduced the state's financial income.

Besides causing the above unfavorable factors, the generator shutdown at the Baogang Power Plant also has created new dangers for safe operation of the East China Grid: because electrical energy is difficult to store, it must be simultaneously utilized and generated, and safe operation of the East China Grid requires that the voltage cycle of the transmitted power be maintained within a certain range. The two generators at the Baogang Power Plant were included in the design of the East China Grid. When one of its generators shuts down, inadequate output at power plants in the East China Grid has resulted in low cycle operation for many days. The effects of shutting down this generator can have a snowball effect on safe grid operation. Even more troubling is that a 300,000 kW generator at the Shidongkou Power Plant which originally was set for an overhaul in the spring of 1989 has been forced to operate in an unhealthy fashion because there has been no opportunity to shut it down. This has gone on for 2 months now. Thus, a generator shutdown at the Baogang Power Plant has the effect of "pulling one hair and affecting the whole body" for economic construction and grid safety.

Zhang Liquan said that Baogang's generators are the most advanced in Shanghai and in China. Baogang Power Plant takes one-third to one-half less coal than a medium or small-sized power plant to produce the same amount of power. China now has a coal shortage, and we should assure that our advanced generators operate at full load to attain the goal of reducing coal consumption

while increasing power output as planned. The coal shortage at the Baogang Power Plant is a negative action in their "big battle" for coal now and is due to a lack of other economic measures which are at present unknown. It is troubling, however, to see the phenomenon of China's best generator having to shut down.

Shanxi Increases Coal Production

40100052d Beijing XINHUA in English 0805 GMT 27 May 89

[Text] Taiyuan, May 27 (XINHUA)—Shanxi Province, the leading coal producer in China, turned out 75.12 million tons of coal in the first 4 months of this year, 8.1 percent more than the figure for the same period of last year.

The province provides 80 percent of the coal needed in the country and one-third of China's total annual exported coal.

However, coal exports from Shanxi dropped in the first quarter as a result of energy shortages and increased domestic demand.

To turn the situation around, the State Council has taken a series of remedial measures, including preferential treatment for export-oriented departments.

In April, both coal production and export picked up again.

A local foreign trade official expected that the province will fulfill the state coal export quota set for the first half of this year by the end of June.

New Mine in Heilongjiang

40100052c Beijing CHINA DAILY (BUSINESS WEEKLY Supplement) in English 29 May 89 p 1

[Text] The Dongrong Coal Mine, one of the nation's key projects, is being built in eastern Heilongjiang Province.

Located on the plain between the Heilong, Wusuli and Songhua rivers, the coal field covers an area 28 kilometres long and 8 kilometres wide. The coal deposits there total 1.1 billion tons.

Four pairs of shafts will be built.

Upon completion, the mine will have a combined production capacity of 5.1 million tons a year. The mining period will be between 70 and 100 years.

China Sets Strategic Targets for Offshore Oil

40130093a Beijing RENMIN RIBAO in Chinese 14 Apr 89 p 1

[Article: "Strategic Targets for Offshore Oil Set"]

[Text] China's short-term objectives and development strategy for offshore oil were recently established. By 1992, China is to find 1.2 billion tons of geological reserves of petroleum and 150 billion cubic meters of natural gas. Petroleum production capacity is to reach 5 million tons and natural gas production capacity 1.2 billion cubic meters.

Currently, China's offshore petroleum industry is in a key period when it must find more reserves and increase output. The development strategy to be followed from now on will continue and expand foreign cooperation and self-management. To deal with the urgent need for energy in Guangdong, Hainan and the East China coastal region, we will continue to import foreign capital, intensify exploration, and engage in systematic and planned establishment of an offshore gas region in the western South China Sea, including the southeast Qiongzhou-Yinggehai basin and the Zhujiang estuary basin and Zhujiang delta offshore depression zone. We will vigorously develop the oil and gas resources of the Donghai Basin, China's largest continental-shelf sedimentary basin, and strive to begin cooperation as early as possible. In addition, we will select suitable partners for foreign cooperation and develop new petroleum refining and petrochemical regions.

Big Breakthrough for Oil, Gas Exploration in East China Sea

40130089a Shanghai WEN HUI BAO in Chinese 31 Mar 89 p 1

[Article by reporter Lu Yongfeng [4151 3057 6912]: "Another Big Breakthrough in Oil and Gas Exploration in East China Sea, 'Pinghu Structural Zone' Is a Big Oil and Gas Pool, 'Pinghu No 4 Well' Produces Almost 2,000 Cubic Meters of Crude Oil Daily"]

[Text] The East China Sea has China's best oil and gas prospects, and another breakthrough has been made in oil and gas exploration. Gu Zongping [7357 1350 1627], acting bureau director in the Ministry of Geology and Mineral Resources Marine Geology Survey Bureau, announced at a press conference on 30 March 1989 that the "Pinghu No 4 Well" drilled to explore the Fang'eting structure in the Pinghu oil and gas pool in the East China Sea continental shelf basin produced up to 1,892.85 m^3 of crude oil and 1.486 million m^3 of natural gas daily, one of the highest single well daily outputs of marine wells in China. This result has provided a reliable foundation for calculating reserves and early development in the Pinghu oil and gas pool, and it opens a new realm for studying categories and regularities of oil and gas pools in the East China Sea.

"Pinghu No 4 Well" was the fourth exploratory oil and gas well drilled in the Pinghu structural zone in the East China Sea continental shelf basin. Drilling of the other three wells was completed, respectively, in 1983, 1986, and 1987. Industrial oil and gas flows were obtained during logging. The large amount of geophysical data and continuous breakthroughs in exploratory drilling have confirmed that the "Pinghu structural zone" is a rather large oil and gas pool. The "Pinghu No 4 Well" is located in a marine area about 440 km offshore in a southeast direction. Drilling of the well began on 16 April 1988. Exploratory drilling was stopped for a period to avoid typhoons and the platform was removed to an anchorage. The drilling platform returned to "Pinghu No 4 Well" on 23 October 1988 and continued working after successfully finding the mouth of the well on the first try. Drilling was completed without hitches on 9 December 1988 after deeper drilling to a total depth of more than 3,750 m.

The State Planning Commission has included oil and gas exploration in the East China Sea among key projects in the Seventh 5-Year Plan. The Ministry of Geology and Mineral Resources Marine Geology Survey Bureau has drilled 15 oil and gas wells in the East China Sea to date, and industrial oil and gas flows were obtained from six of them. High carbon dioxide gas output was obtained from one well, and oil and gas indications were obtained from the remainder. The Ministry of Geology and Mineral Resources Marine Geology Survey Bureau is now actively uniting with the relevant units to propose a preliminary feasibility program for early exploitation of oil and gas at Pinghu in the East China Sea to develop technical economic research and debate for early exploitation of East China Sea oil and gas pools and other topics.

High-Yield Well Sunk in South China Sea

40100052e Beijing XINHUA in English 1338 GMT 28 May 89

[Text] Beijing, May 28 (XINHUA)—A high-yield natural gas well has been drilled in the Yinggehai Basin in the western part of the South China Sea, proving a rich reserve of natural gas in the area.

The YA 13-1 well drilled jointly by the China National Offshore Oil Corporation (CNOOC) and a U.S. company produces more than 1 million cubic meters of natural gas daily.

The drilling of the well proved that the area has a natural gas reserve of 116 meters in depth. Zhong Yiming, general manager of CNOOC, said a big natural gas field could be built in the area.

Zhong said that the State Council has approved the building of the gas field. The State Council also approved that part of the gas produced will be liquefied for export so as to earn hard currency needed for the joint exploration.

The general manager also said that since China's offshore oil industry had been developing under the guidance of open and reform policies, the contract-stipulated rights and interests of foreign companies cooperating with China would be fully guaranteed.

Tarim Basin Reserves To Be Developed

40100052b Beijing XINHUA in English 0805 GMT 16 May 89

[Text] Beijing, May 16 (XINHUA)—China will spend 1.5 billion yuan (405 million U.S. dollars) in the next 2 years in a massive effort to develop oil reserves in the Tarim Basin of the Xinjiang Uygur Autonomous Region.

According to the NORTHWEST CHINA INFORMATION HERALD, the development will be spearheaded by the China Oil and Gas Corporation, and supported by 11 other companies which will provide essential backup equipment, goods and materials.

Twenty desert seismic teams, 17 drilling teams, and a large number of technical and research personnel will also be sent to help exploit oil reserves in the region.

An oil field with an annual production capacity of 5 million tons (35 million bbl) is expected to be built in the region by 1992, the newspaper added.

National Oil Firm Sets 5-Year Goals

40100050a Beijing CEI Database in English 9 May 89

[Text] Beijing (CEI)—The China National Offshore Oil Corp (CNOOC) recently worked out its strategy for the next five years.

Its goal in foreign cooperation is, by 1992 and 1995, to verify oil deposits of 600 million tons and 800 million tons respectively, and to raise its annual production capacity to 3.5 million tons and 5 million tons respectively.

Its domestic goal by 1992 and 1995 is to find 600 million tons and 700 million tons, and to produce 1.5 million tons and 3 million tons respectively.

The corporation plans to establish a natural gas zone in the western waters of the South Sea, striving to discover 300 billion cm gas deposit by 1995. It also plans to explore and develop the East China Sea Basin at an early date.

The establishment of a large petrol chemical plant capable of processing 5 million tons of heavy oil per year is also under consideration.

Meanwhile, the corporation is scheduled to discover over 100 million tons of oil deposit and 70 billion cm of natural gas, and produce 900,000 tons of crude oil this year.

Zhongyuan Oil Field Is Among Fastest-Growing in Nation

40130090a Beijing KEJI RIBAO in Chinese 30 Mar 89 p 1

[Article: "Zhongyuan Oil Field's Rate of Development Places Among the Leaders"]

[Text] In 10 years of development, the Zhongyuan oil field, which [because of its shape and productivity] has been called the "golden guitar," has made science and technology establish themselves in its enterprises, and by the end of 1988 it had produced a cumulative 37.406 million tons of crude oil for the nation, 32 times the level when it began production in 1979. This rate of development places it among the top fields nationwide.

The Zhongyuan oil field, centered in the Puyang region of Henan, includes 12 counties and has an area of 5,300 square kilometers. On the map it is shaped like a Chinese guitar. Geologists call it the Eastern Puyang Depression. Abundant oil and gas resources lie beneath it. But faults have developed within the depression and its structure is complex, in addition to which the oil and gas are rather deeply buried, and the layer of salt above the parent rock readily dissolves in water in the course of drilling and may become highly plastic, thus adding to the difficulties of exploration and development of the field.

In 1983 the Zhongyuan oil field announced as its development policy that "To develop toward science we need reserves, we need output, and we need benefits" and began to rely on science and technology to vitalize the oil field. The principal methods and experiences were as follows: 1) It used science to map out the prospects of the oil field. After spending 3 years reaching new levels in exploration, drilling, oil field development and oil field construction, in 1988 it set itself a new objective: having science lead the way, in 3 years it would develop production capabilities that were well rounded in terms of technology and equipment, would strive to make rapid advances in important exploration and development processes, and would gradually establish a modern, highly scientific and technical oil field city. 2) It organized science and technology for a decisive breakthrough. At the behest of the State Council, nearly 200 experts, professors and scientific and technical personnel from 51 research units, institutions of higher education and mining enterprises from throughout the country gathered at Zhongyuan and undertook a scientific and technical breakthrough effort. Since 1986 the oil field has established long-term cooperative ties with more than 30 institutions of higher education and research and military units, has signed more than 80 scientific and technical cooperation agreements, has solved key technological problems in oil field exploration and development, and has raised the quality of its development of complex fault block structures. 3) It made the reform of the scientific and technical system more thorough. The oil field implemented a compensated scientific and technical contracting system throughout and developed science and technology markets. It replaced

the old system of allocated operating expenses with a compensated contract funding system and implemented such methods as meeting expenses out of earnings, benefiting from profits and bearing losses, payment of a percentage of excess profits to the higher levels, and retention of profits to establish various funds, so that the scientific and technical personnel made vigorous efforts in the assurance that they would earn more. For the key research projects, it created project managers, most of whom were chief engineers or deputy chief engineers, so that they were effective in solving such problems as on-the-spot tests, intermediate connections, and personnel organization and placement. 4) It accelerated the conversion of scientific and technological results into productive capabilities. In particular, it mastered system research, developed a well-rounded set of technologies, and laid the equipment basis for conversion to powerful production capabilities. Last year alone the oil field made breakthroughs in 5 major technologies, completed 8 equipment-set projects, made major advances in 10 technologies, and won 93 scientific and technical progress awards. In order to train high-level personnel, last year the oil field selected more than 30 scientific and technical personnel from the production units and dispatched them to institutions of higher education to obtain master's degrees. 5) It imported, assimilated and disseminated advanced foreign technology and mastered its Chinese production. Since 1983, the oil field has borrowed $280 million from the World Bank and the Bank of China, has signed 230 technology contracts, and has imported 4,859 seismic prospecting, development, well logging, drilling mud and other advanced technologies and equipment from the United States, France, West Germany and other countries; 322 projects have won Ministry of the Petroleum Industry and state science and technology achievement awards.

Head of the Zhongyuan oil field's exploration office Jin Yusun [6855 3022 5529] states that infusing science and technology into the enterprises, i.e., relying to the greatest possible extent on new technology, new processes, and specialized knowledge of personnel, is an important prerequisite for assuring that the Zhongyuan oil field will continue its rise.

Jilin Conserves Energy, Reduces Waste To Ease Power Shortage

40130093b Changchun JILIN RIBAO in Chinese 13 Apr 89 p 2

[Article by Li Shuwen [2621 2885 2429]: "Vigorously Conserve Energy and Decrease Consumption To Alleviate the Energy Shortage"]

[Text] Recently, after Prime Minister Li Peng had heard the reports at a national energy industry conference, he stated that henceforth the energy industry must concentrate equally on development and conservation. This general policy must be adhered to for a long period. Currently, with our extreme energy shortage, the reaffirmation of this general policy not only has far-reaching strategic significance, but also extremely great current significance.

Jilin Province has an industrial structure with high energy consumption and there is great potential for conservation. Not only is energy in short supply, but there is serious waste. About 20 percent of key energy-consuming enterprises have put an end to the practices of not checking the amounts of fuel that are delivered, not keeping records of consumption, and setting no targets in their accounting; nearly 50 percent of the industries are experiencing increases both in energy consumption per 10,000 yuan of output value and in energy consumption per unit output of their major products. Progress in energy conservation is unbalanced. For example, in the coal extraction and dressing industry there are eight key energy-consuming enterprises, among which the lowest energy consumption per 10,000 yuan of output value is 10.1 tons, while the highest is 55.3 tons, or 4.5 times as great. Although there are factors such as the type of facilities and production conditions that limit their comparability, the figures do reflect differences in the enterprises' awareness of energy consumption and in their management standards. At the county level and above, energy consumption per 10,000 yuan of output value is 50.8 percent above the national average, and respectively 13.8 and 13.3 percent above the figures for the neighboring provinces of Liaoning and Heilongjiang. The energy consumption figures per unit output of the main products are far above the national average: an investigation of comparable energy figures for 23 product varieties in the province indicated that the figures for 12 of the products were at least 20 percent above the national average, and that they were ever farther above pace-setting levels. The problem energy-consuming equipment that has been declared obsolete by the state but is being adopted by small-town enterprises is rather serious. In large and middle-size enterprises, 81 percent of the equipment is at the technological level of the 1950's or earlier. Of about 15,000 industrial boilers in the province, more than half are 1950's products or earlier, with a thermal efficiency of 50 percent or less, 20 percent below the national average. As a result, the enterprise energy utilization rate is 20 percent below the national average. This high-energy-consumption industrial structure and product mix present Jilin Province with arduous energy conservation tasks, but also indicate that the province's energy conservation potential is great. As a result, adjustment of the industrial structure and product mix and efforts to decrease energy consumption per 10,000 yuan of output value are major aspects of energy conservation.

Over the past year, the province has achieved gratifying results in energy conservation. The provincewide energy saving has been equivalent to 575,000 tons of standard coal, overfulfilling the annual energy conservation plan by 15 percent. A major effort has been made in conserving electrical energy, with a saving of 460 million kilowatt-hours for the year, 50 percent above the planned

figure. The energy consumption per 10,000 yuan of output value in the key energy-consuming enterprises was down 7.2 percent from the previous year. Seven of the 7 energy-intensive products on which the state has placed limitations are produced in the province, and the average energy consumption per unit output of these 7 products was lower than the state target. By the end of 1988, 5 enterprises in the province had become national class 1 energy conservation enterprises, 29 had become national class 2 enterprises, and 140 had become province-level energy conserving enterprises.

Although efforts to save energy and decrease consumption in the province have resulted in major achievements, progress is still uneven. Energy consumption by some enterprises and for some products is still rising, and there is still great potential for conservation. In particular, since last year, the extreme shortage of electric power has severely limited Jilin's economic development and the people's livelihood. In the first 2 months of this year, the energy supply situation actually became increasingly grave. The amount of power allocated to Jilin Province this year by the northeastern power grid is 41 percent short of the province's real needs. The allocation for January is below the corresponding figure for 10 years ago. The "shut down 3 and operate 4," "shut down 4 and operate 3," and "shut down 5 and operate 2" plans are being used throughout the province's industry, and some major power users have ceased production in order to save heat. As a result of the energy shortage, although we give priority to rural grain processing and to domestic electric power for the city dwellers, power cutoffs and limitations remain severe in many areas. The provincial party committee and government have taken the lead in attaching extraordinary importance to the provincewide electric power supply situation, and the main leaders of the provincial government have held many meetings urging vigorous efforts to assure the supply of coal and electricity. For the first quarter of this year, specific arrangements have been made throughout the province for extra-plan power generation and for allocation and transport of the coal and oil needed for power generation. In spite of these efforts, the energy shortfall in the first quarter still exceeded 20 percent. These circumstances require that we persist in keeping electrical use in line with plan figures and in conserving electricity. In particular, we must make major efforts to adjust the energy consumption structure. In the fourth quarter of last year, Jilin's actual energy use figure was down 9.7 percent from the same period of the preceding year, but total industrial output was up 14.7 percent: one of the main reasons was a great decrease in the output of energy-intensive products, while the output of urgently-needed, high-benefit, low-energy-consumption products was greatly expanded, making effective use of limited supplies of electricity.

At the beginning of the year, the provincial party committee and government issued a notice regarding thorough provincewide implementation of the "two increases and two conservations" movement, stating the clear requirement that the total energy consumption per 10,000 yuan of industrial output must decrease by 3 percent from the 1988 figure. All of the assignments that were stated at the provincewide energy conservation conference held at the beginning of the year called for the development and vigorous implementation of appropriate measures and for efforts to assure their success.

In 1989 we must continue to intensify our leadership in energy conservation, conscientiously and effectively readjust the product mix and industry structure, further readjust the energy consumption structure, encourage the production of low-energy-consumption products, stringently limit the output of energy-intensive products, and continue to have the "six small" high-energy-consumption enterprises cease production and give up their energy allocations. We must further decrease the amount of oil used in oil-burning households and further strengthen management to assure that oil use is in line with plan figures and that oil is conserved. During the serious energy shortage, we must focus on effectively arranging for the supply of oil for domestic use by city dwellers, electric power for municipal governments and rural grain processing, for drying foodstuffs, and in addition, the production of products serving the needs of agriculture, necessities, export products that earn foreign exchange, and high-demand products that recover currency. We must effectively manage and use the limited supply of electricity. In addition, we must further strengthen conservation management; in the process of making the reforms more thorough, existing energy conservation management organizations and personnel at all levels must be further stabilized and strengthened. We must continue with the effort to raise enterprises to higher energy conservation categories while assuring growth. We must conduct energy utilization and energy conservation monitoring on a provincewide scale and intensify the legal and administrative aspects of energy conservation. We must continue regularly announcing targets for energy consumption and electric power consumption per 10,000 yuan of industrial output value and unit-output energy consumption targets for the main industrial products, and we must do effective energy work in conservation statistics and management.

Advantages of HTGR's in Future Nuclear Power Development Surveyed

40130092a Chongqing XIN NENG YUAN [NEW ENERGY SOURCES] in Chinese Vol 11 No 2, 5 Feb 89 pp 43-45

[Article by Cheng Shanke [7115 0810 4430], Southwestern Reactor Engineering Research and Design Institute: "Position of HTGR's in the Development of Nuclear Power"]

[Excerpt] [Passage omitted] In China, the rapid takeoff of coastal open economic zones and interior economies and their entry into international competition require above all that we solve the energy problem. The construction of small modular HTGR's [high-temperature gas-cooled reactors] continues to be an effective way of alleviating the energy shortages of certain areas as rapidly as possible. To alleviate rail transport of coal and decrease environmental pollution we must accelerate the development of coal-based chemical engineering; and HTGR's are a major means of gasification and liquefaction of coal. HTGR's also have extensive prospects for use in the petrochemical industry and in thermal extraction of viscous oil.

Small modular HTGR's are an attractive means of solving the energy problems of the developing countries. Bangladesh hopes to construct a 300-500 million kW modular HTGR power plant and to cooperate with China in the feasibility study stage. Thus, building HTGR power plants not only will help to meet China's energy needs, but also offers the possibility of exporting Chinese nuclear technology.

HTGR's also have extensive application potential in the developed countries. Nuclear power has been recognized as the energy source of the 21st Century. After the year 2010 many of the currently existing nuclear power plants will be shut down, creating a need to construct many new power plants. By that time, HTGR's will be a major reactor type used in second-generation nuclear power plants and will therefore have great potential.

As a representative second-generation reactor type, HTGR technology is approaching maturity, but these reactors still involve some risk for the investor, and demonstration power plants are needed for further testing of their cheapness and reliability. As a consequence, the transition from first-generation to second-generation nuclear power plants will take a long time. Although nuclear power plant construction in China is still in its initial stage, there are many favorable conditions, such as the maturation of medium and small-size conventional fossil-fired technology, so that steam turbine generating units with capacities of 600,000 kW or less can now be built. We have an abundance of manpower and a contingent in nuclear science and technology with considerable abilities that includes all specialized disciplines. We have relatively mature reactor design, construction and operating experience and can assimilate and master HTGR technology rapidly. International cooperation will enable us to construct the low-cost HTGR power plants suited to developing countries. The developed countries are treating China as a market for the sale of nuclear power plants and as a partner in developing second-generation nuclear power plants; we thus have the possibility of obtaining rather favorable conditions in international cooperation. As a result, the present time offers an excellent opportunity for developing nuclear power that must not be allowed to slip away. If we make use of this opportunity and make thorough use of China's advantages and of the favorable conditions of international cooperation, we will be able to lay an advance foundation for China to join the leaders in world nuclear power development in the next century and to catch up with the world state of the art in certain areas such as modular HTGR technology. In nuclear power development we currently face both challenges and opportunities, both risks and successes. We must seize the opportunity, act decisively, and accelerate research and development in the field of second-generation nuclear power plants.

With the China Nuclear Power Corporation and the Ministry of Nuclear Power leading the way, the Eastern Power Plant Equipment Sets Corporation, the Southwestern Reactor Engineering Research and Design Institute, the Beijing Nuclear Engineering Research and Design Institute, the Southwestern Electric Power Design Institute and Chongqing City have already joined together in a supplier-proprietor consortium, which has had contacts and discussions with foreign firms and has also carried on independent preliminary feasibility studies of the use of the Chinese-foreign joint-capital model for joint construction of a first small modular HTGR demonstration station in Chongqing. It is hoped that the preliminary feasibility study will be completed in early 1989. The author believes that by engaging in international cooperation and making thorough use of China's existing industrial base, we can rapidly construct a demonstration power plant with a minimum expenditure of funds and time and form a new type of nuclear power industry by the end of the century, thus making good preparations for the arrival of the second generation of nuclear power plants and laying the groundwork for China's arrival among the front ranks in nuclear power in the next century and its entry into international markets.

The author thanks Comrade Qian Hehui [6929 0735 1920] for valuable suggestions.

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China Opts for 600 MW Pressurized-Water Reactors

40130083c Shanghai JIEFANG RIBAO in Chinese 18 Feb 89 p 1

[Article by reporters Zhao Mingliang [6392 2494 0081] and Huang Xiaonan [7806 2556 0589]: "China Chooses To Develop a Rational Nuclear Power Reactor Type, Batch Production of 600 MW Pressurized-Water Reactors Could Reduce Project Construction Costs"]

[Text] China will accelerate the pace of nuclear power construction by using 600 MW pressurized-water reactors as its primary reactor type.

Minister Huang Yicheng [7806 3015 6134] of the Ministry of Energy Resources said at the National Nuclear Industry Work Conference which ended on 17 February 1989 that whether one is speaking of construction costs, economic results, or system safety, 600 MW nuclear power generators are the most appropriate for the scale of nuclear power in China and we should focus on them for batch production to reduce nuclear power project construction costs.

With our present energy shortage and little hope of solving it within the short term, Huang Yicheng feels that we can no longer hesitate. We should move quickly to concentrate our forces and develop 600 MW nuclear reactors.

Coal accounts for 75 percent of China's energy resource structure at the present time. However, there are definite limits to our coal reserves, we are restricted by transport capacity, and it creates severe atmospheric pollution. For this reason, Huang Yicheng feels that, in the long-term perspective, China must develop nuclear power.

The experts say that pressurized-water reactor nuclear power plants have been widely adopted in the world in numbers far in excess of heavy-water nuclear power plants.

Huang Yicheng said that the development principle of China's nuclear power industry is "focus on China, Chinese-foreign cooperation." China will design and manufacture our own 600 MW nuclear power generators and basically shift to domestic equipment production. We also will use various forms to seek cooperation with foreign countries. China is now in the process of selecting foreign partners for cooperation in the area of nuclear power.

The experts revealed that China will build Qinshan into a nuclear power base area. Besides the 300 MW nuclear power generator now being urgently built, we also will build four 600 MW nuclear reactors there to form a nuclear power reactor colony at Qinshan. The 600 MW dual-reactor Qinshan Nuclear Power Plant has been approved and included among projects by the State Council and relevant departments are now involved in the initial preparatory work.

Qinshan To Be Operational in 1990

40130083b Beijing RENMIN RIBAO in Chinese 14 Feb 89 p 1

[Article by reporter Zhao Mingliang [6392 2494 0081]: "Qinshan Nuclear Power Plant Focusing on Equipment Installation To Assure Formal Connection to Grid and Power Generation by the End of 1990"]

[Text] General manager Jiang Xinxiong [5592 1800 7160] of the China Nuclear Industry Corporation stated at a corporation work meeting on 13 February 1989 that the first period of the Qinshan Nuclear Power Plant Project has entered the equipment installation stage and the Daya Bay Nuclear Power Station has entered the peak civil engineering stage. Qinshan Nuclear Power Plant will be connected to the grid and generate power in 1990. This will end China's historic lack of nuclear power.

Pouring of the first concrete for Qinshan Nuclear Power Plant began in March 1985. The first stage of the 300 MW project has finished installing the containment vessel dome and hoist for the reactor pressure vessel. Welding of the main piping also has begun, and the quality is excellent.

More than 37 meters of the steel sleeve for the containment vessel at the No 1 reactor at Guangdong's Daya Bay Nuclear Power Plant have been installed and work is proceeding smoothly.

Jiang Xinxiong said that for the past 2 years Qinshan Nuclear Power Plant has focused on installation and debugging, preparation for production and operation, and assuring completion and power generation by the end of 1990. By 1990, installation of the primary equipment for the No 1 reactor at Daya Bay Nuclear Power Station, which will have an installed generating capacity of 1,800 MW, will be completed and the dome of the containment vessel for the reactor of the No 2 generator will be installed.

The 1,200 MW second stage project at the Qinshan Nuclear Power Plant has been approved by the State Council, and initial preparations are beginning.

Jiang Xinxiong called on the Qinshan and Daya Bay Nuclear Power Projects to adhere resolutely to the principle of quality and safety first, and assure the quality of nuclear power construction.

He revealed that China will build several large nuclear power plants in Liaoning, on the east coast, and in other areas during the Eighth 5-Year Plan and will strive to complete 6,000 MW and begin building 6,000 MW before the end of this century.

Qinshan Nuclear Reactor 'Core' Passes Acceptance Check

40130096 Beijing RENMIN RIBAO (Overseas Edition) in Chinese 18 Apr 89 p 1

[Text] Shanghai, 17 Apr (XINHUA)—The Qinshan Nuclear Power Plant reactor-vessel internal structure, critical equipment for the 300-megawatt reactor, passed national-level acceptance checks yesterday. During the Qinshan nuclear plant's construction, this is the first large-scale equipment to undergo national-level acceptance check.

The difficulty of manufacturing the reactor-vessel infrastructure, the "core" of the reactor, is recognized the world over. This equipment was designed by the Shanghai Nuclear Engineering Design Institute and manufactured by the Shanghai No 1 Machine Tool Plant. Its total weight is 85 tons, its height is 8.8 meters, and its maximum diameter is 3.25 meters; altogether, 15,056 parts comprise the total unit.

Equipment for Qinshan's Nuclear Island in Final Production Stage

40130092b Shanghai WEN HUI BAO in Chinese 1 Apr 89 p 1

[Article: "Main Equipment for Qinshan Power Plant's Nuclear Island Enters Final Production Stage"]

[Text] Some of the major equipment for the 300,000-kW nuclear generating island designed by the Shanghai Boiler Plant, namely the evaporators, the pressure stabilizer and some reactor components, has already entered the final production stage. Yesterday, Shanghai Deputy Mayor Gu Chuanxun [7357 0278 6064], China Nuclear Industry Corporation deputy director Zhao Hong [6392 1347], and leaders of relevant organizations of the State Council and the Shanghai municipal government visited the Shanghai Boiler Plant to observe production. They encouraged the personnel of the plant to make a final push and to complete their task with high quality and on schedule.

The Qinshan Nuclear Power Plant is China's first independently developed facility. Fully 15 years has already elapsed since Premier Zhou Enlai approved its construction. The main equipment is being developed by such key enterprises as the Shanghai Boiler Plant, the Shanghai Heavy Machinery Plant, the Shanghai Steam Turbine Plant, the Shanghai Electric Motor Plant, the Shanghai No 1 Machine Tool Plant. The nuclear island, which is the centerpiece of the nuclear power generating unit, was developed primarily by the Shanghai Boiler Plant, which has already devoted more than 10 years of effort to it. This April the plant will complete the first evaporator and pressure stabilizer, and the final evaporator will be turned out in June.

Work Progressing on Qinghua Experimental Heat Supply Reactor

40130083a Beijing KEJI RIBAO in Chinese 18 Feb 89 p 1

[Article by Ma Xuquan [7456 2700 3123]: "Civil Engineering Construction Completed at Qinghua University Experimental Low-Temperature Nuclear Heat Supply Reactor, Technical Systems Basically Completely Installed, Debugging and Operation To Follow"]

[Text] The 5 MW experimental low-temperature nuclear heat supply reactor designed and developed by Qinghua University's Nuclear Power Technology Institute has entered the final stage of construction. Installation of the technical systems is basically complete, and it will undergo debugging operation soon.

The low-temperature nuclear heat supply reactor was a key technical project in the state's Seventh 5-Year Plan. The low-temperature nuclear heat supply reactor uses nuclear power for centralized heating in urban areas and is a new route for peaceful utilization of nuclear energy. Heat supplies account for a substantial portion of our energy consumption structure. Over 400 million tons of the 603 million tons of commodity energy resources consumed in China in 1980 was used for heat supply, more than three times the amount used for power generation. China has growing coal and petroleum shortages and extremely acute problems with coal transport. Burning coal also severely pollutes the urban environment. Nuclear heat supply is an effective way to solve these problems. A heat supply reactor with 450 MW of thermal power and an auxiliary peak value boilerhouse can heat a 10 million m^2 structure. The low-temperature heat supply reactor has the advantages of simple equipment, small investments, and short construction schedules. It also has advantages relative to coal-fired boilers in conserving coal, not polluting the environment, providing low-cost heat supplies, and so on. Preliminary estimates show the cost of a nuclear heat supply to be about 30 percent less than a boiler heat supply.

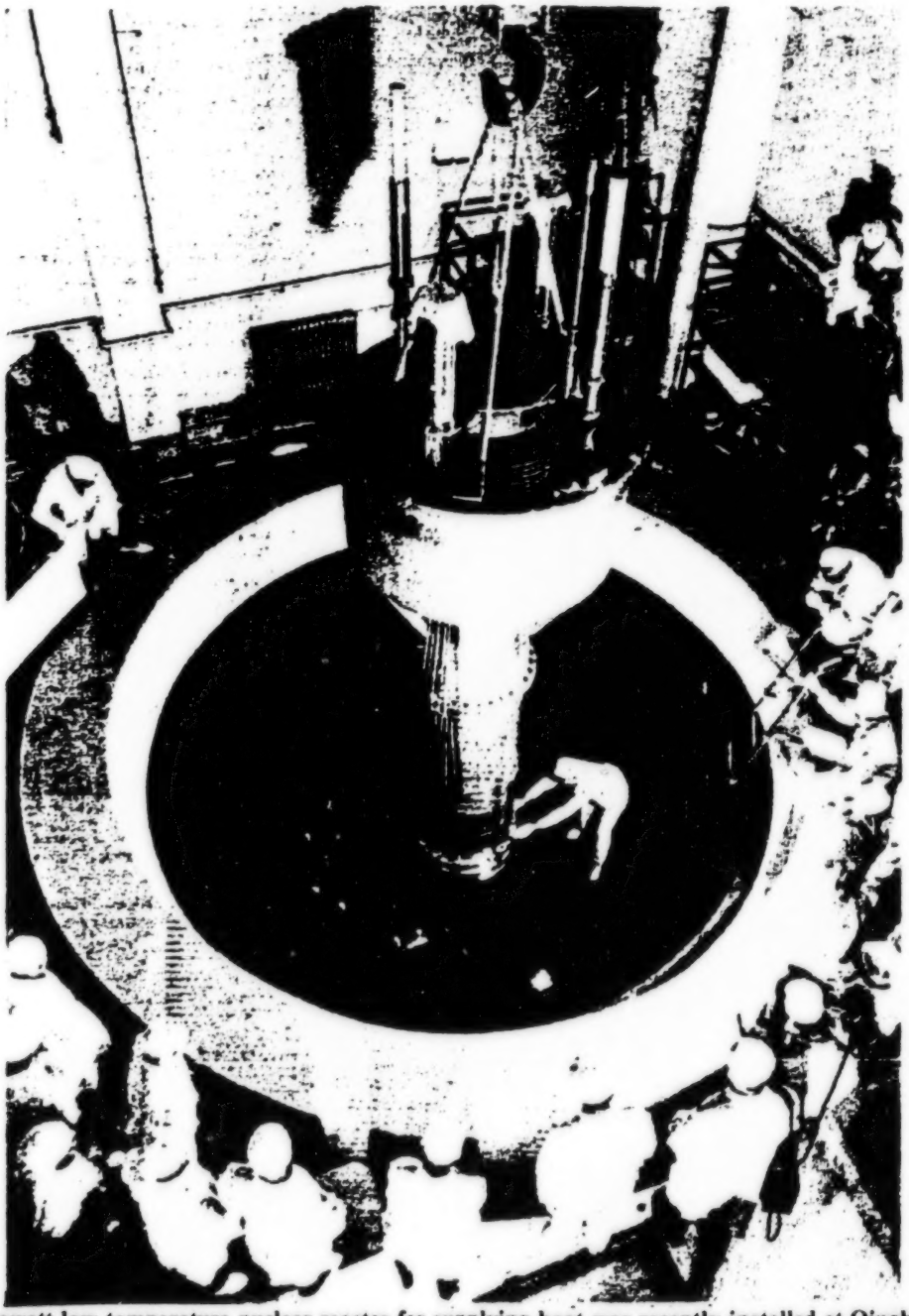
Civil engineering for the 5 MW experimental low-temperature nuclear heat supply reactor designed and manufactured by the Qinghua University Nuclear Power Technology Institute began in March 1986. All the civil engineering is now completed and installation of 13 technical systems and equipment is finished. Installation of four remaining systems is now under way and 13 important scientific research experiments have been completed. Moreover, they are now receiving examination and approval by the State Nuclear Safety Bureau and preparations for operation are under way. This reactor is special in that it employs low temperature, low pressure, and low power density. It uses natural cycles, has no rotating parts or valves, does not rely on external power for cooling, has an integral structure, has no primary water pipelines, valves, etc. outside the reactor, uses dual-casing pressure bearing, and has an intermediate isolation loop, so it is extremely safe and reliable. The reactor's hydraulic transfer structure for the control rods was among the first group of patents awarded by the state. Cold-state and hot-state experiments were successful.

Song Jian [1345 0256] and other comrades expressed great interest when visiting the S&T development product of the Qinghua University Nuclear Power Technology Institute on 2 February 1989. They saw the Qinghua University screened experimental reactor built in 1964, the 5 MW experimental low-temperature nuclear heat supply reactor under construction, valve experiment loops, control rod experiment console, high-temperature gas-cooled reactor encased fuel pellets and equipment for making fuel elements, and precision ceramics laboratory. When his visit ended, Song Jian pointed out that China needs nuclear power and will certainly develop it in the future. He congratulated Qinghua University Nuclear Power Technology Institute for the rich content of its research, highly effective S&T development, vigorous work situation, and contributions to the national economy, and he offered congratulations to comrades throughout the institute.

5-Megawatt Heat-Supply Reactor Undergoing Tests

40100051 Beijing CHINA DAILY in English 8 May 89 p 1

[Text]



This five-megawatt low temperature nuclear reactor for supplying heat was recently installed at Qinghua University in Beijing. Scientists are busy testing it before it can be put into operation. Nuclear power is seen as a viable solution to China's severe energy shortage.

Six Million-Kilowatt Capacity Planned by End of Century

40130098 Shanghai WEN HUI BAO in Chinese 21 Apr 89 p 1

[Text] China's nuclear power development goals call for a capacity equal to [the burning of] 12 million tons of standard coal [a year] by the end of this century. The total installed capacity of these nuclear power plants will be 6 million kilowatts, which will generate some 30 billion kilowatt-hours of electricity each year. In addition to the two nuclear power plants at Qinshan and Daya Bay, plants will be constructed in Liaoning Province and other areas. In fact, Liaoning recently established a nuclear power leading group.

Third Nuclear Power Plant To Be Built in Liaoning

40130095 Shanghai WEN HUI BAO in Chinese 3 Feb 89 p 1

[Text] China will build a nuclear power plant at one of two sites in Liaoning Province—Xingcheng or Wafangdian in Dalian. It will be the third nuclear power facility in China following Qinshan and Daya Bay.

In the last several years, there has been a daily worsening of the power shortage situation in Liaoning. The plan to build this nuclear power plant at Xingcheng has already been given a nod of approval from the central authorities.

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